AD-A130 263 DREAMY DRAW DAM - MASTER PLAN AND FEATURE DESIGN NEW RIVER AND PHOENIX CITY STREAMS ARIZONA(U) ARMY ENGINEER DISTRICT LOS ANGELES CALIF SEP 81 1/2

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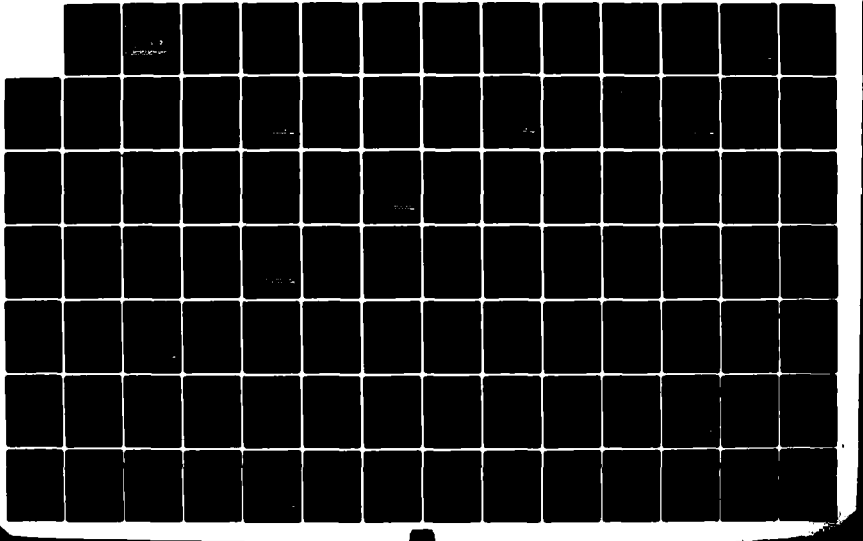

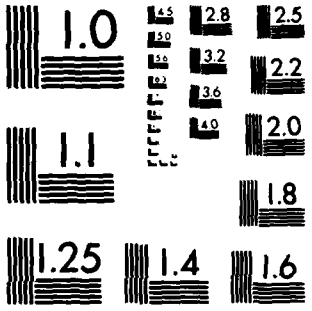

Dreamy Draw Dam
Master Plan & Feature Design

New River and Phoenix City Streams, Arizona

Design Memorandum No. 5

September 1981

U.S. Army Corps of Engineers
Los Angeles District

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Recreation Planning

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Dreamy Draw Dam provides flood protection to the Metropolitan Phoenix area. This document provides a factual, environmentally sound basis for the development, use, and management of both natural and man-made resources, within Dreamy Draw Dam basin. The document also presents a specific land use site plan with estimated costs for such a plan.

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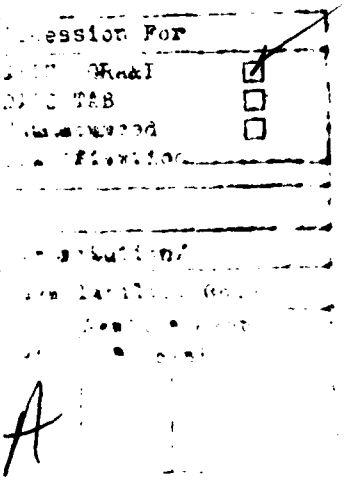
New River and Phoenix City Streams, Arizona

MASTER PLAN AND FEATURE DESIGN FOR

DREAMY DRAW DAM

Design Memorandum No. 5



U.S. Army Corps of Engineers
Los Angeles District
September 1981

REPORTS PREVIOUSLY ISSUED

Title	Date	Date Approved by OCE
Interim Report on Survey for Flood Control - Phoenix, Arizona and Vicinity (including New River)	Jan. 1964	May 1965
Feature Design for Dreamy Draw Dam, Gila River Basin, New River and Phoenix City Streams, Arizona	Jan. 1972	May 1972
Final Environmental Impact Statement, Dreamy Draw Dam, Maricopa County, Arizona	Mar. 1972	May 1972 (filed with CEQ)
New River and Phoenix City Streams, Arizona, Hydrology, Part 1	Oct. 1974	Mar. 1975
New River and Phoenix City Streams, Arizona, Design Memorandum No. 3, General Design Memorandum - Phase I, Plan Formulation	Mar. 1976	July 1977 (SPD App)
Final Environmental Impact Statement, New River and Phoenix City Streams, Maricopa County, Arizona	Mar. 1976	Sept. 1976 (filed with CEQ)
New River and Phoenix City Streams, Arizona, Design Memorandum No. 3, General Design Memorandum - Phase II, Project Design		
Part 1 - Cave Buttes Dam (including Cave Creek to Peoria Avenue)	July 1976	July 1977
Part 2 - Adobe Dam (including Skunk Creek to the Arizona Canal)	Apr. 1979	Dec. 1979
New River and Phoenix City Streams, Arizona, Design Memorandum No. 4, Overall Master Plan	Sept. 1980	

REPORTS SCHEDULED FOR FUTURE ISSUANCE

Title	Scheduled Date
New River and Phoenix City Streams, Arizona, Design Memorandum No. 3, General Design Memorandum - Phase II, Project Design	*
Part 3 - New River Dam (including New River to Skunk Creek)	Apr. 1982
Part 4 - Skunk Creek and New and Agua Fria River below the Arizona Canal Diversion Channel	Apr. 1983
Part 5 - Arizona Canal Diversion Channel (including Cave Creek Channel)	Dec. 1983
New River and Phoenix City Streams, Arizona, Design Memorandum No. 6, Master Plan and Initial Development Feature Design Memorandum, Cave Buttes Dam	Feb. 1982
New River and Phoenix City Streams, Arizona, Design Memorandum No. 7, Master Plan and Initial Development Feature Design Memorandum, Adobe Dam	Aug. 1982
New River and Phoenix City Streams, Arizona, Design Memorandum No. 8, Master Plan, New River Dam	July 1982
New River and Phoenix City Streams, Arizona, Design Memorandum No. 9, Future Development Feature Design Memorandum, Cave Buttes Dam	Sept. 1983
New River and Phoenix City Streams, Arizona, Design Memorandum No. 10, Feature Design Memorandum, New River Dam	July 1985
New River and Phoenix City Streams, Arizona, Design Memorandum No. 11, Future Development Feature Design Memorandum, Adobe Dam	Sept. 1989
New River and Phoenix City Streams, Arizona, Design Memorandum No. 12, Feature Design for Cultural Resources Interpretive Center	*

* Not determined

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Introduction

Chapter I

INTRODUCTION

A. PROJECT AUTHORIZATION. The New River and Phoenix City Streams project, also known as the Phoenix, Arizona, and Vicinity (including New River) project, was authorized by the Flood Control Act of 1965 (Public Law 89-298) approved 27 October 1965. Section 4 of the Flood Control Act of 1944, as amended by Section 207 of the Flood Control Act of 1962, authorized the Corps to construct, maintain, and operate public parks and recreation facilities at water resource development projects. The law also permits the Corps to authorize local interests to construct, maintain, and operate recreation facilities at water resource development projects (pl. 1).

B. PROJECT PURPOSE. The authorized purpose of the project is to provide flood protection to residential, commercial, industrial, agricultural, and public and semipublic lands in the Phoenix metropolitan area (pl. 2). As a result of comments by the Board of Engineers for Rivers and Harbors, recreation development was investigated and determined to be economically justified and, therefore, included as a project purpose.

C. PURPOSE OF MASTER PLAN AND FEATURE DESIGN MEMORANDUM. The primary purpose of this master plan and feature design memorandum is to provide a factual, environmentally sound basis for the development, use, and management of both natural and man-made resources within the Dreamy Draw Dam basin. The secondary purpose is to present a specific land use site plan with estimated costs for such a plan. The memorandum is also intended to serve as a guide for preparation of plans and specifications and for the operation and management criteria for the Dreamy Draw Dam recreation features.

D. SCOPE OF THE MASTER PLAN AND FEATURE DESIGN MEMORANDUM. The overall plan of development is consistent with the General Land Use Plan of the City of Phoenix. The master plan and feature design memorandum contain the categories of information listed below:

- Background information. Included are project location, pertinent data, and status used to describe the project.
- Environmental resource analysis. This is an overview of the natural and cultural elements that are interpreted to provide a factual basis for developing the land use plan.
- Social and economic factors. A market study of the regional, social, and economic factors that influence development of the land use plan--factors that determine anticipated attendance and recreation-user desires and needs.

- Land use plan. This is a synthesis of the environmental resources and the social and economic factors, including anticipated attendance, pertinent to the project area. Existing and potential land use are considered in determining the optimum use of an area.

- Site plan. Presented are specific recommendations for development of the project site that are determined by analysis of the land use plan, design criteria, and management objectives. Also included are schematic plans, building plans, and cost estimates.

- Design criteria. Given are guidelines or standards to follow in planning recreation facilities and associated site development.

- Resource management guidelines. These are general concepts and policies for management of the Dreamy Draw Dam basin and facilities by the local sponsor. Specific elements of the operation, maintenance, and management will be prepared in conjunction with the local sponsor within 1 year after completion of the project development.

E. PRIOR PERTINENT REPORTS. A list of previously issued design memoranda appears in the front matter of this plan. The reports most applicable to development in the Dreamy Draw Dam basin are listed below:

Feature Design for Dreamy Draw Dam	Jan. 1972
Final Environmental Statement, Dreamy Draw Dam	Mar. 1972
New River and Phoenix City Streams, Arizona Design Memorandum No. 3 - General Design Memorandum - Phase I Plan Formulation	Mar. 1976

Additional publications and references used as guides in the preparation of the master plan and feature design memorandum for the Dreamy Draw Dam basin are listed below:

The Park and Recreation Plan, Phoenix, Arizona Parks and Recreation Board and Planning Commission, City of Phoenix	June 1969
The Park and Recreation Plan, Summary, Phoenix, Arizona, Parks and Recreation Board and Planning Commission, City of Phoenix	July 1970
Recreational Planning, Development, and Management Policies (ER 1165-2-400) Office of the Chief of Engineers, Department of the Army	Aug. 1970

Federal Participation in Recreational Development (EC 1120-2-404)
Office of the Chief of Engineers, Department of the Army — Aug. 1970

A Park, Recreation, and Open Space Study
Maricopa County Planning and Zoning Department, Maricopa Association of Governments — Sept. 1970

State of Arizona, Statewide Comprehensive Outdoor Recreation Plan
Arizona Outdoor Recreation Coordinating Commission — 1970

Environmental Quality in Design of Civil Works Projects (EM 1110-2-38)
Office of the Chief of Engineers, Department of the Army — May 1971

Recreation Planning and Design Criteria (EM 1110-2-400)
Office of the Chief of Engineers, Department of the Army — Sept. 1971

Recreation Resources Planning (ER 1120-2-400)
Office of the Chief of Engineers, Department of the Army — Nov. 1971

An Open Space Plan for the Phoenix Mountains
City of Phoenix — Jan. 1972

Design of Recreation Sites, Areas and Facilities (ER 1110-2-400)
Office of the Chief of Engineers, Department of the Army — Sept. 1974

Principles Governing Financial Participation by the Corps of Engineers in Recreation Development of Local Flood Control Projects
Office of the Chief of Engineers, Department of the Army — June 1976

Design for the Physically Handicapped (EM 1110-1-103) and (ER 1110-1-102)
Office of the Chief of Engineers, Department of the Army — Oct. 1976

Arizona Statewide Comprehensive Outdoor Recreation Plan, Arizona Outdoor Recreation Coordinating Commission — Jan. 1978

Resource Use: Establishment of Objectives (ER 1105-2-167)
Office of the Chief of Engineers, Department of the Army — Apr. 1978

Design for the Physically Handicapped (ETL 1110-1-95) May 1978
Office of the Chief of Engineers,
Department of the Army

F. REFERENCES. The following references were used in the preparation of the master plan and feature design memorandum for Dreamy Draw Dam basin:

Arizona Climate, Ed. William D. Sellers and Richard H. Hill, Tucson, Arizona, U. of Arizona Press, 1974.

Arizona Republic and Phoenix Gazette, Inside Phoenix 1978, Phoenix, Arizona, Phoenix Newspapers, Inc., 1978.

Burton, Susan S.: A Regional Archaeological Overview of the Phoenix Metropolitan Area. Prepared for Los Angeles District, Corps of Engineers by the Arizona State University, Dept. of Anthropology, January 1977.

Demaree, Salome R., Eleanor L. Radke, and Janet L. Witzeman: Annotated Field List, Birds of Maricopa County, Arizona. Phoenix, Arizona, Maricopa Audubon Society, 1972.

Elements of Outdoor Recreation Planning, Ed. B.L. Driver, Ann Arbor: U. of Mich. Press, 1970.

Maslow, Abraham H.: Motivation and Personality, New York, Harper and Row, 1954.

Thiele, Heinbrich J.: Present and Future Water Use and Its Effect on Planning in Maricopa County, Arizona. (Phoenix, Arizona) Maricopa County Board of Supervisors and the Maricopa County Planning and Zoning Dept., September 1965.

U.S. Department of Agriculture, Soil Conservation Service, General Soil Map, Maricopa County, Arizona, Washington, D.C., U.S. Government Printing Office, 1969.

U.S. Government Printing Office, House Document No. 94-51, 94th Congress, 1st Session, Serial No. 94-A, Report on Endangered and Threatened Plant Species of the United States, Washington, D.C., 1975.

Valley National Bank of Arizona, Arizona Statistical Review, Phoenix, Arizona, Economic Research Dept., Valley National Bank, 34th edition, 1978.

G. APPLICABILITY OF SELECTED PUBLIC LAWS. The following laws provide guidance for the development and management of Federal projects for various purposes, according to the intent of Congress and as they apply to the New River and Phoenix City Streams Project:

1. Section 4, Public Law 78-534 (The Flood Control Act of 1944), as amended, authorizes the Corps of Engineers to construct, maintain, and operate public park and recreation facilities at water resource development projects and to permit local interests to construct, maintain, and operate such facilities.

2. Public Law 85-624 (The Fish and Wildlife Coordination Act of 1958) provides for the integration of fish and wildlife conservation in water resource projects. The U.S. Fish and Wildlife Service has prepared a report, dated 1 February 1978, pertaining to the fish and wildlife resources of the project area. The recommendations and findings contained in the report have been given full consideration. Coordination with related State and Federal agencies was maintained during the development of this master plan.

3. Section 204, Public Law 89-298 (The Flood Control Act of 1965) authorizes the Corps of Engineers to construct the New River and Phoenix City Streams Flood Control Project for flood protection at Phoenix, Arizona, and vicinity.

4. Public Law 91-190 (The National Environmental Policy Act of 1969) requires that the environmental effects of each project and the means and measures to minimize any adverse effects be evaluated and presented in an environmental impact statement. Although the Environmental Impact Statement (EIS) for the New River and Phoenix City Streams project does not address the impact of recreation development at the Dreamy Draw Dam basin, the Environmental Assessment prepared for the basin area states that the environmental impacts are neither significant nor controversial. Therefore, a supplement to the EIS is not required.

Project Description

Chapter 2

PROJECT DESCRIPTION

A. PROJECT LOCATION. Dreamy Draw Dam and basin are located along Dreamy Draw Wash approximately 8 mi (13 km) north of the Phoenix Civic Plaza in downtown Phoenix. The basin is just south of Northern Avenue, north of Paradise Valley Access Relief Road, and 1 mi (1.6 km) east of 16th Street. The Dreamy Draw Dam basin is surrounded on all sides by the 9711-acre (3930-ha) Phoenix Mountains Preserve. The dam and project area occupy approximately 80 acres (32 ha) of the total 1.3 mi^2 (3.367 km^2) drainage area of Dreamy Draw Wash.

B. PROJECT FEATURES. Dreamy Draw Dam was completed in August 1973, at a cost of $611,000. Landscaping of the downstream face of the main embankment and the borrow areas, completed in December 1974, cost an additional $60,000. Storage capacity of the dam is 281 acre-ft (346 613.5 m^3) for flood control, and 36 acre-feet (44 406 m^3) for sediment accumulation over a 100-year period. The dam reduces a standard project flood (SPF) with peak inflow of 3600 ft^3/s (101.9 m^3/s) to an outflow of 220 ft^3/s (6.2 m^3/s).

The main embankment is a compacted earthfill structure with a maximum height of 50 feet (15.2 m) above the streambed. The crest of the dam at elevation 1418 feet (432.2 m) is 448 feet (136.6 m) long.

A zoned compacted earthfill saddle dike crosses the saddle between the right abutment of the dam and Northern Avenue. The dike is approximately 1060 feet (323 m) long and stands 20 feet (6.1 m) above the streambed.

An ungated, reinforced, concrete, 3-foot (.9 m) diameter conduit is in the main embankment. The outlet has a 220 ft^3/s (67.1 m^3/s) maximum discharge when the water is at spillway crest.

The unlined spillway is excavated in rock approximately 400 feet (122 m) southeast of the left abutment of the main embankment. The concrete sill at elevation 1405 feet (428.5 m) is 100 feet (30.5 m) long. The spillway is designed to pass a SPF with a peak discharge of 7000 ft^3/s (198.2 m^3/s) with 5 feet (1.5 m) of freeboard. Pertinent physical data are included in table 1.

C. RESERVOIR OPERATION. Dreamy Draw Dam was designed to detain water only during floods. Regulation of flood waters is automatic through the ungated outlet conduit. SPF inflow at Dreamy Draw peaks in approximately 50 minutes at 3600 ft^3/s (101.9 m^3/s). Essentially the entire 6-hour, 320 acre-foot (394,720 m^3) SPF is contained in the reservoir. Key elevations versus times are shown in the list below for the SPF, which represents a flood with an approximate frequency of 350 years.

Elevation feet (metres) above MSL		Time
1380	(420.9)	0.0
1389	(423.6)	0.5
1398.5	(426.3)	1.0
1402.5	(427.8)	1.5
1404	(428.2)	2.0
peak height--1404.5	(428.4)	2.5

The time required to drain the SPF through the outlet is approximately 17 hours.

The Los Angeles District does not plan to place a hydrographic telemetry device at the dam. If the inflow is large enough, personnel of the operating agency (Flood Control District of Maricopa County) will be dispatched to inspect the structure and obtain hydraulic and hydrologic data.

Table 1. Pertinent Physical Data for Dreamy Draw Dam.

Item	Measurement		
Drainage Area	1.3 mi^2		(3.37 km^2)
Dam (rolled earthfilled)			
Crest elevation	1,418	ft msl	(432.4 m)
Maximum height above streambed	50	ft	(15.2 m)
Crest length	448	ft	(136.6 m)
Freeboard	5	ft	(1.5 m)
Spillway (detached, broadcrested)			
Crest elevation	1,405	ft msl	(428.5 m)
Crest length	100	ft	(30.5 m)
Elevation of maximum water surface	1,413	ft msl	(430.9 m)
Outlets works (ungated conduit)			
Length	264	ft	(80.5 m)
Intake elevation	1,368.7	ft	(417.41 m)
Outlet elevation	1,263.4	ft msl	(415.82 m)
Saddle dike			
Crest length	1,060	ft	(323.3 m)
Maximum height above existing ground	20	ft	(6.1 m)
Reservoir			
Area at spillway crest	26.7	acres	(96.31 m^2)
Capacity (gross) at spillway crest	317	acre-ft	(0.3 hm^3)
Storage allocation below spillway crest			
Flood control	281	acre-ft	(0.3 hm^3)
Sedimentation	36	acre-ft	(0.04 hm^3)
Standard project flood			
Total volume (6 hours)	320	acre-ft	(0.3 hm^3)
Peak inflow	3,600	ft^3/s	(101.94 m^3)
Peak outflow	220	ft^3/s	(6.23 m^3)
Drawdown time	17.0	hr	
Peak spillway discharge	7,000	ft^3/s	(198.22 m^3)

Construction Status

Chapter 3

CONSTRUCTION PROJECT STATUS

A. GENERAL. Construction of Dreamy Draw Dam and appurtenances was completed in September 1973 at a cost of $611,000, and landscaping was completed in December 1974 at a cost of $60,000. The Flood Control District of Maricopa County, the local flood control sponsor, operates and maintains the flood control features.

Recreation development was not included at the time of the initial construction of flood control features. However, the Design Memorandum No. 3, General Design Memorandum - Phase I, Plan Formulation, approved by the South Pacific Division of the Corps of Engineers in July 1977, recommended recreation be provided in the flood control basin. The recommended plan of development, shown on Site Plan, plate 3, will be fully developed the first year Federal and local funds are available for construction. Plans and specifications for recreation construction will be completed immediately before initiation of construction. The recommended recreation construction schedule is shown in figure 1.

B. LOCAL COST-SHARING ABILITY. In accordance with Federal policy based on House Committee Report No. 254, which accompanied Public Law 89-72, cost sharing of recreation is required between the Federal Government and the local interests. Under this policy, local interests must meet the following requirements.

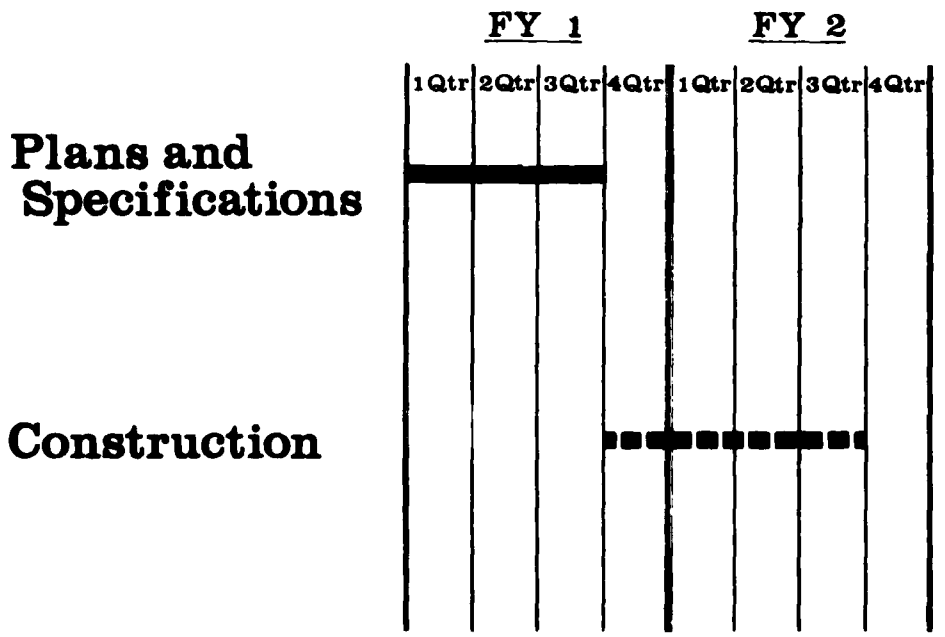
1. Provide fee title to all lands needed for recreation development and insure public control of the development, with appropriate credit, as given below in paragraph 2.

2. Where the appraised value of the land so provided amounts to less than 50 percent of the total first cost of the recreation development, make additional contributions sufficient to bring the non-Federal share to at least that level; additional contributions may consist of the actual cost of carrying out an agreed-on portion of the development, or a cash contribution, or a combination of both.

3. Operate, maintain, and replace without expense to the Federal Government, the recreation areas and all facilities installed pursuant to the agreement.

Costs will be shared equally by the City of Phoenix and the Corps of Engineers for initial construction of all recreation facilities and associated development. On 22 May 1979 the City of Phoenix passed a bond issue that funded the Dreamy Draw Dam Recreation Area. The City of Phoenix, in its letter dated 11 March 1980 (appendix 2) has formally indicated its willingness to provide half of the first cost of construction for recreation development, and bear all costs associated with operation, maintenance, and replacement of the recreation facilities.

RECREATION CONSTRUCTION SCHEDULE* DREAMY DRAW DAM



*Construction of Dreamy Draw Dam was completed in 1973

Figure 1. Construction Schedule

Environmental Resources

Chapter 4

ENVIRONMENTAL RESOURCES

A. GENERAL. In making planning decisions for land use, planners rely on a data base that inventories the environmental resources in the area. "Natural resources and landscapes are the major components which make many types of recreation experiences possible."* A resource inventory is essential to the planner because resource development is integrally dependent on the environment.

The following section presents the environmental resources considered in the development of the land use plan for the Dreamy Draw Dam basin. Both intrinsic and extrinsic qualities of the site are identified. Qualities that lead to the development of proposed land uses are interpreted and evaluated in Chapter 6.

B. CLIMATOLOGY. The Dreamy Draw basin is in the Sonoran Desert climatic zone. Like that of the City of Phoenix, the climate of the basin area is dry; it receives an average of less than 8 inches (203 mm) of precipitation a year. Summer thunderstorms, of short duration but high intensity, bring most of the annual rainfall. The summers are hot and the winters are mild with clear days and cool nights. U.S. Weather Bureau records indicate a long-term average temperature of about 70° F (21° C), with the temperature ranging from a summer maximum commonly above 100° F (38° C) to a winter minimum seldom below 32° F (00° C). The prevailing winds blow from the east during the day and from the west at night (pl. 4).

Average wind velocities are low to moderate, approximately 6 mph (10 km/h); only during thunderstorms, which usually occur during July and August, are there high, gusty, winds.

C. PHYSIOGRAPHY. The Dreamy Draw Dam basin is in the Sonoran Desert region of the basin and range physiographic province. The basin lies in the southeastern part of the Phoenix Mountains between North Mountain Park, elevation 2104 feet (641.3 m), and Squaw Peak, elevation 2608 feet (794.9 m). Squaw Peak is the most dominant topographic feature in the Phoenix Mountains and is south of the Dreamy Draw Dam basin. The Phoenix Mountains, which have a northwest-southeast alinement, flank Phoenix on the northeast. Dreamy Draw flows southwest from these mountains. The relatively flat valley floor of the City of Phoenix can be viewed from the higher points in the project area.

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*National Urban Recreation Study: Executive Report. U.S. Dept. of the Interior, Feb. 1978 p. 28.

Elevations within the project boundaries range from about 1380 feet (421 m) to 1480 feet (451 m). The terrain is hilly. Slopes are predominantly less than 15 percent with moderate to steep slopes interspersed throughout the basin (pl. 5).

D. GEOLOGY. The project area consists of moderate slopes of hard to moderately soft weathered platy metamorphic bedrock overlain by older and Recent alluvium. Rock formations in the vicinity are composed chiefly of Precambrian metamorphic rock. The predominant rock type is schist, but quartzite, marble, and slate also are present. Older alluvium of Quaternary age consists of terrace deposits, talus, residual debris, and slope wash. The alluvium consists of a well-cemented gravelly, silty sand, ranging in thickness from a thin veneer on the slopes to about 20 feet (6 m) at the base of the south (left) abutment along the streambed channel. Here it consists of a thin mantle of loose sandy gravel. Much of the older alluvium occurring along the side slopes and in the streambed in the reservoir basin has been removed by gravel pit operations. The rock depth in the spillway varies from ground surface to approximately 17 feet (5 m) and is overlain by older alluvium.

E. SEISMICITY. The earthquake potential in the Dreamy Draw Dam area is considered small. The area is assigned to Zone 2 on the Seismic Risk Map of the United States. This is a low seismic risk zone, presenting few restrictions on development.

F. HYDROLOGY. The total drainage area for Dreamy Draw Dam is relatively small, 1.3 mi^2 (3.4 km^2). Dreamy Draw Wash contains flows only during and immediately after storms within the drainage basin (pl. 6). Precipitation in this drainage basin results from three types of storms: general winter storms, general summer storms, and local thunderstorms. A brief description of each storm type is given in the following subparagraphs.

a. General winter storms are the result of weather fronts passing through the area from the Pacific Northwest. The storms occur between December and March and reflect an orographic influence in their passage; they are of low intensity and may last for several days. Most winter precipitation results from these large-scale cyclonic storms.

b. General summer storms, which occur during the months of July through September, are largely the result of tropical storms originating in the Gulf of Mexico or occasionally along the Mexican Pacific Coast. These storms produce heavy precipitation in large areas. They reflect orographic influence and can cause flash flooding along washes or large rivers.

c. Local thunderstorms are common in the months of July through September, but can occur at any time of the year, either during general storms or as isolated phenomena. The local thunderstorms cover comparatively small areas and are of high intensity, but short duration, usually 3 hours or less. The local thunderstorms produce many of the destructive flash floods, that are well known in the southwest.

The combination of high rainfall intensities, moderately low infiltration rates, steep slopes, and low vegetative densities results in large flows usually of short duration. In the small area around the reservoir, runoff from a high-intensity thunderstorm will reach the reservoir within minutes; it will bring the flood pool level to the 50-year-flood elevation within 45 minutes. The spillway approach channel will be inundated within 90 minutes, and water will reach the spillway crest in 3 hours.

G. GROUNDWATER. Water table levels in the area are variable. Perched water, which is found randomly throughout the basin, is a shallow natural water-holding basin; it occurs as the result of an impervious layer of material situated within a total area of porous soils, thereby creating a catchment for water percolating through the soil. The closest identified well, within 1 mi of the Dreamy Draw site, is 600 feet (183 m) deep.

H. SOILS. The Dreamy Draw project area is located on the foot slopes of the Phoenix Mountains. These slopes are hard to moderately soft, weathered, slaty metamorphic bedrock, overlain by older and Recent alluvium. This is an alluvial fan formed by drainage runoff. Soils here are characteristically very gravelly loams interspersed with sandy loams. Identifying soils and soil associations is useful for planning such land uses as recreation development. A soil association is a landscape with a distinct pattern of soils. It normally consists of one or more major soils and at least one minor soil; a soil association is named for its major soil.

Three soil series are apparent in the project area. These are identified as antho, cavelt, and rock land. Each soil series has a similar profile on which the major horizons are alike in thickness, arrangement, and other important characteristics. The gravely loams and sandy loams are the most common textures on the surface layer. Selecting areas suitable for recreation development is partially dependent on the soil type. Three degrees of limitations are described below:

- Slight - Restrictions, if any, are only minor problems; they are easily overcome.
- Moderate - Limitations require careful planning and design; cost of correction is an important design consideration.
- Severe - Limitations may be too costly to overcome; proposed development cannot be justified.

These interpretations are made on the basis of slope, hazard of flooding, permeability, texture, presence of coarse fragments on the surface, rockiness, depth of bedrock, water table level, available water capacity, salinity, and alkalinity.

The rating of a particular soil does not necessarily limit use for a specific purpose, but it does indicate a large outlay of effort and money to overcome the inherent unsuitability for a particular type of development or use.

The following soils have been identified by the Soil Conservation Service as existing in the Dreamy Draw Dam project area (pl. 7).

Antho: AoB

Antho soils consist of deep, gravelly, sandy loams on alluvial fans extending from mountain areas. These soils are generally on a 1 to 3 percent slope with moderately rapid permeability and fair to good compaction and fill qualities. Since they consist of 15 to 35 percent gravel, water erosion and soil blowing are slight to moderate hazards. The limits for recreation development of paths, trails, buildings, and picnic areas are slight to moderate.

Cavelt: CeC

This soil series consists of well-drained soils with a lime centered hardpan at a depth of 5 to 20 in. (127 mm to 508 mm); this makes permeability slow in the hardpan areas. Characteristically on 1 to 5 percent slopes, these gravelly loams are formed on alluvial fans from acidic and basic igneous rocks; water erosion is a slight hazard. Although there are severe limitations for building dwellings, these soils have moderate restrictions for development of picnic areas, paths, and trails.

Rock Land: Ro

Rock lands are areas with 50 to 70 percent exposed rock and local rubble. The soils are very shallow gravelly loams, sandy loams, and clay loams. Permeability is variable with very rapid runoff. Limitations of rock land soils for recreation development are severe because of the amount of exposed rock and 9 to 75 percent slopes.

I. VEGETATION. The Dreamy Draw Dam basin and adjacent lands are typically Arizona Desert (part of the Sonoran Desert). The vegetation in this area is generally sparse, except along the natural drainageways. Desert riparian trees and shrubs occur in abundance along parts of Dreamy Draw. These desert wash species include blue palo verde, mesquite, burrobrush, desert broom, and desert thorn. The outwash slopes and hills have primarily cresote bush vegetation interspersed with brittlebush, triangle bursage, little leaf palo verde, ocotillo, and various cacti species (pls. 8 and 9). Destructive past land uses have contributed to the establishment of some weedy plants such as salt cedar, Jerusalem thorn, pig weed, and Bermuda grass.

Revegetation of the downstream face of the dam is well established. Plants used include saguaro, ocotillo, and Bermuda grass. The areas used for borrowing of material in construction of the

dam also have well established vegetation. Regrading, topsoil replacement, and revegetation were the techniques used in restoring borrow areas.

Compatibility of the borrow areas with the surrounding environment was achieved by using native grasses and plants for revegetation. Some of the species of plant materials used for revegetation of borrow areas are fishhook cactus, barrel cactus, ocotillo, creosote bush, yellow palo verde, honey mesquite, and little leaf palo verde.

Along Paradise Valley Access Relief Road and Northern Avenue, the City of Phoenix has planted a variety of arid region plants. These include sweet acacia, blue palo verde, Mexican palo verde, Chilean mesquite, creosote bush, ocotillo, saguaro, fishhook cactus, and barrel cactus.

J. WILDLIFE. The animal population in the Dreamy Draw Dam basin is sparse because of the lack of surface water, limited vegetative cover, disturbance by man, and poor soil conditions for burrowing animals. Various habitat elements are essential to different types of wildlife. Past destruction of native plants and surface disturbance caused by off-highway vehicle use and mining have severely limited the natural habitat necessary for wildlife. Wildlife in this area is highly mobile with species also occupying the closely associated Phoenix Mountains Preserve.

Representative animals occuring in the regional area include mammals, amphibians, reptiles, and birds.

1. Mammals include the black-tailed jack rabbit, desert cottontail rabbit, rock squirrel, and Harris' antelope ground squirrel; such mice as the southern grasshopper, western harvest, cactus, deer, rock pocket, and Arizona pocket; Merriam's kangaroo rat, white-throated wood rat, valley pocket gopher; and occasional carnivores such as the coyote, badger, gray fox, bobcat, striped skunk and spotted skunk.

2. Amphibians and reptiles include the spadefoot toad, Great Plains toad, red-spotted toad, desert tortoise, leopard lizard, tree lizard, collared lizard, side-blotched lizard, banded gecko, chuckwalla, western whiptail, and several snakes, including the coachwhip, bullsnake, night snake, and western diamond-back rattlesnake.

3. Birds include the white-winged dove, mourning dove, Gambel's quail, roadrunner, poor-will, gilded flicker, verdin, cactus wren, brown towhee, black-throated sparrow, house finch, logger head shrike, cardinal, Lucy's warbler, curve-billed thrasher, black-tailed gnatcatcher, Wied's crested flycatcher, ash-throated flycatcher, Gila woodpecker, ladder-backed woodpecker, common screech owl, elf owl, great horned owl, red-tailed hawk, and sparrow hawk.

The sparse animal populations in the project area are highly mobile and most species may occur in desert wash, desert hills, and outwash slope communities. Some species--such as the rock pocket mouse,

collared lizard, and chuckwalla--are generally more commmonly found in rocky areas. Bird nesting is usually more dense in the trees associated with the desert washes. Although many species may occur in the regional area, the animal populations in the project area are small at any one time.

K. PALEONTOLOGY. Paleontological remains are not common to the Phoenix Mountains. To date no evidence of fossils has been found in the basin. However, no formal paleontological investigations have been conducted in the Dreamy Draw Dam project area.

L. ARCHEOLOGY. An archeologic survey of the detention basin and spillway area was conducted by the University of Arizona in November 1970. No evidence of prehistoric occupation or use was identified. However, regional archeologic overview maps of the Phoenix metropolitan area (January 1977 and February 1977) show the Phoenix Mountains to be a zone of moderate archeologic sensitivity (Burton, 1977). Moderate sensitivity zones are presumed to have few and/or less significant archeologic remains.

The inventory of archeologic resources was compiled, recorded, and evaluated in terms of potential archeologic value. Inventory maps are a generalized, rather than specific, representation of the resources because the information utilized was based on predicted rather than recorded data. The inventories are valuable as a planning tool to identify areas of relative sensitivity to avoid extensive adverse impact to significant archeologic resources.

According to the archelogic survey of the Gila River Basin, New River and Phoenix City Streams project area (Dittert, Jr., 1976), research along the Dreamy Draw channel did not produce evidence of any archeologic or historic remains, "in spite of a concerted effort to examine every undeveloped space." A previous survey of the Dreamy Draw Dam site and channel uncovered only three sherds of Wingfield Plain found at the northeastern edge of the Dreamy Draw reservoir. To date, excavations of depths to 39.5 feet (12 m) associated with a new housing development revealed no buried cultural remains.

M. HISTORY. No historic sites are noted in the National Register of Historic Places for the Dreamy Draw Dam basin. An initial survey of historic resources in the Phoenix metropolitan area was completed in February 1977 (Fryman, Jr; Woodward, Jr; and Garrision; 1977). The report indicates no historic resource sensitivity within the Phoenix Mountains Preserve Area. There are, however, ruins of several kilns that were used in mining operations southeast of the basin. The City of Phoenix preserved the kiln site by detouring around it for alinement of the Paradise Valley Access Relief Road. Future plans of the City of Phoenix include investigation of the ruins to determine the period of use and other information.

N. MINING CLAIMS. Prior to construction of the flood control features, parts of the basin were used for stone quarry operations. The Bureau of Mines has noted the existence of certain abandoned underground mercury mines in the Dreamy Draw Dam basin vicinity. Three test holes have been excavated in the basin. Two test holes were approximately 7 feet (2.1 m) by 6 feet (1.8 m) by 8 feet (2.4 m) deep, and one hole was about 6 feet (1.8 m) by 5 feet (1.5 m) by 4 feet (1.2 m) deep. A surface inspection made by a Los Angeles District, Corps of Engineers geologist did not reveal any evidence of mercury mineralization in the basin. These holes now need to be filled.

O. ROADS IN THE PROJECT AREA. Several unimproved roads lie in the project area. These are the result of past construction activities in the basin. Off-highway vehicles have used these roads while also cutting new trails throughout the site. The unimproved road starting at Dreamy Draw Drive and traveling east under 19th Street passes through the double-barrel equestrian underpass and terminates at the spillway. This road is presently used for car and equestrian access to the basin. An improved road onsite at the Dreamy Draw Sign (northeast of the embankment) off of Northern Avenue provides access along the top of the embankment for maintenance crews; it is not provided for public use along the embankment. Two high-speed one-way roads encircle the entire Dreamy Draw basin. Northern Avenue, designed for one-way traffic traveling to the southwest, is north of the basin. While Paradise Valley Access Relief Road, carrying traffic in the opposite direction, is south of the basin.

P. EXISTING LAND USE. Open space is the existing land use in the immediate area adjacent to the damsite and basin. Outside the boundaries of the Phoenix Mountains Preserve, land use is primarily high-density-residential development (pl. 10). Lands included within this area are bounded on the west by Central Avenue, Tatum Boulevard on the east, Cactus Road on the north, and Glendale Avenue on the south. The majority of existing land uses are single-family residences. These occur primarily west and northeast of the project site. Multiple-family housing development is sporadic throughout the western half of the project area. Several planned area developments accompany the single-family residences to the northeast and west.

The corridor for general commercial development is to the west along Central Avenue. General commercial development is zoned for wholesale distribution and retailing establishments in immediate association with main highways. The major street crossings are typical of neighborhood and intermediate-commercial zones. Neighborhood zones meet the daily needs of people in the immediate area, such as foodstores and drugstores. Intermediate zones provide sales and services in which the market extends beyond the immediate residential population.

Directly north and southeast of the project site is the Phoenix Mountains Preserve, which is maintained as undeveloped open space used primarily for hiking, jogging, horseback riding, and nature study. Other vacant land in the immediate area is zoned for residential development.

Q. VISUAL QUALITY. The degree of esthetic appreciation and enjoyment of an area is influenced by the visual quality of that area. Visual quality is defined as the composite of elements or scenic resources of an area that convey the character of the area to the individual.

The visual quality of the Dreamy Draw area has been shaped by natural and man-made forces modifying the landscape. Topographic variations within the basin area yield a variety of visual experiences. The relatively gently sloping flood plain of the Dreamy Draw channel contrasts with the steep mountains region flanking the basin. However, several areas in and around the basin have been scarred by human activities. Construction of flood control features (main embankment, dike, spillway, and borrow areas) has altered the visual esthetics of the area. Activities that have caused this change include building construction roads, Northern Avenue, Paradise Valley Relief Road, high-speed circular roads; also, off-road vehicles have been present in the area. An additional activity that has had an influence is that of mining.

Vegetation within the basin is relatively sparse and scattered, with the exception of clusters of dense growth along the stream channel. The combination of topographic and vegetal variety within the basin, the Phoenix Mountains to the north and south, and urbanized portions of the City of Phoenix to the west, provide the resources for development of picturesque spaces and scenic vistas.

Social and Economic Factors

Chapter 5

SOCIAL AND ECONOMIC FACTORS

A. GENERAL. This section presents an overall view of the social and economic factors considered in the formulation of the master plan and feature design memorandum. These include: area of influence, demographic considerations, accessibility of the recreation resource, and a sociological perspective that is a profile of user needs and preferences.

B. AREA OF INFLUENCE. The area of influence, or recreation market area, defines the geographic region from which visitors will travel for recreation experiences. The recreation market area (pl. 11) is delineated by five concentric circles radiating from a point central to the four damsites shown on plate 11. This breakdown exhibits the primary influence associated with the New River and Phoenix City Streams project. The estimated population distribution for 1980 within the five concentric circles is tabulated below.

Distance from the Project Center in mi (km)	Approximate Zone Population
0-10 (0-16)	36,000
10-20 (16-32)	1,106,000
20-30 (32-48)	244,000
30-40 (48-64)	40,000
40-50 (64-80)	14,000

Ninety-six percent of the total market area population (approximately 1,386,000 of 1,440,000 persons) live in Maricopa County. This 96 percent of the market area population accounts for the majority of the county's 1979 population of 1,453,000 persons. For ease of statistics collection, therefore, Maricopa County will be considered the primary market area.

Use from outside Maricopa County by residents of Pima, Yavapai, Coconino, Navajo, and Apache counties has a measurable impact on many of the outdoor recreation activity categories in the county. Nonresidents of the state use this county's recreation resources fairly heavily, as well.

According to the 1978 Arizona Statewide Comprehensive Outdoor Recreation Plan, however, 80 to 100 percent of all outdoor recreation activities occurring in Maricopa County can be attributed to residents of the county.

C. ALTERNATIVE RECREATION RESOURCES. The City of Phoenix has preserved two major mountain areas of over 7,000 acres (2 800 ha) each, as parks. These desert mountain parks are largely undevelopable because of the terrain, but contribute to a feeling of open space in the city. Two

district parks, each under 1,000 acres (405 ha), have been developed, and an additional park has been proposed. Other parks are smaller and occur randomly throughout the city; they are urban oriented, with the exception of undevelopable portions of the mountain parks.

Maricopa County Parks and Recreation Department has been responsible for much of the acquisition and development of park lands within the market area (pl. 12). These parks are regional in appeal and all are within 1 hour's travel time from central Phoenix. The Sun Circle Trail, a system of hiking and riding trails, forms a 110-mile (177-km) loop around the Phoenix metropolitan area and link with the city and county park trail systems (pl. 12).

The proposed development along Reach 11 of the Central Arizona project, from Cave Creek Road to Tolleson, will include a wide variety of recreation facilities.

Other cities in the market area have smaller parks--generally neighborhood or community type in appeal. According to the 1978 Arizona Outdoor Recreation Coordinating Committee (AORCC) Statewide Comprehensive Outdoor Recreation Plan, "Outdoor Recreation in Maricopa County is predominantly urban oriented as expected from the large metropolitan center present *** As the cost of travel goes up with increasing fuel costs there may be more need perceived by the public for these types of facilities nearer to the urban metropolitan area. As handicapped and urban minorities become more active in outdoor recreation there may be additional pressure to develop more of the urban alternatives."

Table 2 shows the regional parks in Maricopa County and their acreages.

Table 2. Inventory of Regional Parks in Maricopa County.

Jurisdiction/Name	Acres		
	Total	Developed	Potentially Developable
Phoenix:			
Camelback Mountain Park	474.79	10.00	0
Phoenix Mountains Preserve	7,700.00	25.00	200.00
Papago Park	888.64	820.61	0
South Mountain Park	15,700.07	800.00	0
Cave Creek Park & Scenic Drive	481.10	0	481.10
Encanto Park	61.01	61.01	0
Esteban Park	64.08	64.08	0
Alvord Park	346.00	0	346.00
Maricopa County:			
Black Canyon Shooting Range	1,433.70	1,000.00	200.00
Buckeye Hills	4,473.90	200.00	2,000.00
Casey Abbot Park	2,124.06	600.00	1,500.00
Cave Creek	3,002.50	0	1,500.00
Thunderbird	726.68	50.00	300.00
Usery Mountain	3,324.24	300.00	3,000.00
Estrela Mountain	16,467.91	0	8,000.00
Lake Pleasant	14,396.00	400.00	4,000.00
McDowell Mountain	20,941.73	140.00	14,000.00
White Tank Mountain	26,331.00	700.00	12,000.00
Paradise Valley Park	340.00	160.00	180.00
Spook Hill Recreation Area	267.40	5.00	262.40
Scottsdale:			
McCormick Railroad Park	30.00	30.00	0
Chapparal Park	74.00	74.00	0
Eldorado Park	55.00	55.00	0
Vista Del Camino	40.00	40.00	0
McDowell Mountain Park	1,280.00	0	200.00
Tempe:			
Papago Park	450.00	56.00	0
Kiwanis Park	125.00	90.00	35.00
Wickenbury:			
Constellation Park	288.00	30.00	258.00

D. DEMOGRAPHIC CHARACTERISTICS. Population statistics are taken from Maricopa County, which comprises 95 percent of the project area. The Arizona Statistical Review for 1978 reports the population in the county was 1,346,500. Approximate 1978 Maricopa County figures show a 38 percent increase in population from the 1970 census. A continuation of this growth rate, which is forecast, projects a population of 1,621,900 in 1985, and 2,352,300 by 2000.

Some demographic information for the immediate area around the Phoenix Mountains Preserve was available in the Arizona Republic/Phoenix Gazette publication Inside Phoenix 1978. This involves portions of Phoenix and the town of Paradise Valley, which were designated Consumer Survey Districts 2, 3, and 8. In applicable cases, this information was included with the market area statistics to further define and accurately portray the user population bordering the Dreamy Draw Dam area. Although Dreamy Draw is located in a region that draws users from the entire market area, it will be most visible to those persons in close association with it. This nearby-user group will most likely use the facilities on weekdays, while others from the entire market area will use the facilities on weekends. Therefore, a further statistical breakdown of the market area is given, when available. The combined population of these three districts is 198,000, with the highest projected increase in growth occurring in District 2, northeast of the Dreamy Draw Dam.

Maricopa County's 1978 population is classified as approximately 94 percent urban, with an average density of 145.9 persons per mi^2. This varies throughout the county, with the highest densities centered in the Phoenix metropolitan area.

The Maricopa County population breakdown by age, according to the Republic Gazette Survey, is as follows:

Age	Percentage
17 and younger	34
18 to 64	55.3
64 and older	10.7
27.8	Median (county)
31.7	Median (District 2)
27.4	Median (District 3)
33.1	Median (District 8)
Retired persons	
District 2	17
District 3	13
District 8	21

1. Education. The 1978 Maricopa County survey provides this information: persons 25 years and older have 12.8 years of schooling; 35 percent are high school graduates; approximately 20 percent have college degrees. In 1977, 89,619 people were enrolled in institutions of higher learning--an increase of more than 20 percent since 1973. Forecasts project this trend for higher education will continue.

2. Income. According to the Republic Gazette survey, the 1978 median income level, per household, was $14,011, which was a 69 percent increase from the 1977 level. The 1977 per capita personal income level was $6,747, which was a gain of $477 over the previous year. The predicted 1980 figures indicate a 22 percent increase in per capita income.

Variation in income levels within the project area are great. North and Northeastern Phoenix--which is the location of Districts 2, 3 and 8--have median income levels, per household, of $18,000 and over, while central Phoenix, along the highway corridor, and south Phoenix show median income levels per household of less than $10,000.

3. Employment. In June 1978, the Arizona Statistical Review reported 563,800 persons had been employed in Maricopa County during the previous year. Employment trends show an increase of jobs, especially in the services, manufacturing, construction, and wholesale-retail trade industries.

The following is the June 1978 occupation breakdown for Maricopa County from the Arizona Statistical Review:

Nonfarm wage & salary	
Manufacturing	88,500
Mining	600
Construction	38,600
Transportation & public utilities	27,000
Wholesale & retail trade	132,800
Finance, real estate	36,100
Services	95,900
Government	91,400
Total nonfarm wage & salary	510,900
Adjustment & all other jobs	52,900
TOTAL Employed	563,800
Unemployed	
Number	33,500
Rate (seasonally adjusted)	5.3%

The Arizona Department of Economic Security projects that agriculture and mining employment opportunities will decrease in the next few years. This decline is directly attributable to the rapid urban growth of the county.

4. Economy. Today, the economy of Maricopa County is based on manufacturing, tourism, retirement, and agriculture. The principle factors responsible for urban growth have been the natural increases in population, corresponding migration to the southwest, and the growth of the defense and aerospace industries.

In 1978, Maricopa County was the largest producer of crops and livestock in the State and the fifth largest in the nation. In 1977, Maricopa County had 509,900 acres (203 960 ha) of crops. The largest crop was cotton; also included were alfalfa, citrus, grains, and vegetables.

Ranked as the second leading income producer in 1977 was the tourism and travel industry; it played a major role in the economy of the county. The tourism industry generated over a billion dollars of revenue in 1976, and it had a 10 percent increase in 1977. This same pattern continued for 1978. Statistics show over nine million passenger cars entered Arizona in 1977. The natural and cultural attractions, coupled with warm dry climate, make Maricopa County a prime destination spot for year-round travelers and conventioneers from all over the world.

Two-thirds of Arizona's manufacturing firms and three-fourths of the manufacturing employment are located in Maricopa County. The largest manufacturing class is electrical and electronic equipment and supplies. The group is aided by defense contracts for the research and development of electronic products. The growth in these industries is also attributable to the following conditions:

- Low humidity levels in Arizona are conducive to the manufacture of electronic equipment.
- Specific locational requirements do not exist for such industries as electronics.
- Local planners look favorably on the desirability of attracting and retaining "clean" (nonpolluting) industry.
- Technical manpower is available.
- A favorable tax structure exists at the State and local level.

To a large extent, the future economic growth of the county will reflect the national economy. The Bureau of Business and Economics Research at Arizona State University has predicted the county's economy will reflect increasing growth in government, manufacturing, tourism, recreation activities, and the service sector. Constraints to future growth will include a slowdown of the national economy, enforcement of pollution standards, and the lack of the development of public facilities.

5. Transportation. Maricopa County is a major transportation center in the southwest. It has railroad lines, airports, and major highways. Interstate Highways 17 and 10 connect Phoenix with Flagstaff and Tucson, and Interstate Highway 8 connects Phoenix with San Diego. A future alinement of Interstate 10 to join Interstate 17 is currently being studied; this would provide a more direct route to Los Angeles.

Over 100 transcontinental, interstate, and intrastate truck lines service the county; overnight service by truck is available to southern California and parts of New Mexico and Utah, and next-day service is provided to 10 additional states. Two railroad lines and transcontinental bus lines serve the area.

Excellent flying conditions have enabled the county to become the 24th busiest aviation center in the nation. Sky Harbor International Airport is served by 10 major airlines; it had 4,984,600 passenger arrivals and departures in 1977. Phoenix recently modernized Deer Valley Airport, located north of the city.

In 1977, the County had registered 646,006 passenger vehicles. It had registered 969,277 total vehicles, which represents one vehicle for every 1.3 persons. This was an increase of 100 percent over the number registered in 1962.

Because Maricopa County has a low-density population and widely dispersed urban growth, no adequate public transportation system has developed. In 1977, the county had 383 buses and 251 taxis. As additional buses have been added, passenger use has increased, but still only .5 percent of the total trips are made on busses.

Existing and proposed large-scale developments are not likely to become autonomous satellite cities. It is unlikely that mass transit links to the high-employment areas of Phoenix will be provided, and even if mass transit were provided, it is unlikely that it would replace the automobile. Consequently, the amount of traffic moving into Phoenix will increase. In the Phoenix area, transportation planning has been conducted over the past several decades. A major street and highway plan was adopted for the area in 1961, and the Valley Area Traffic and Transportation Study (VATTS) was established as an continuing transportation planning program for the metropolitan Phoenix area in 1965. In 1977, the Maricopa Association of Governments Transportation Planning Office (MAGTPO) completed the Phoenix Urban Area Transportation Plan, as directed by the U.S. Department of Transportation.

6. Housing. As of 1 October 1977, the Republic-Gazette survey reported the following breakdown of housing in the Phoenix metropolitan area: single-family dwellings, 63 percent; multiple-family dwellings, 20 percent; townhouse units, 6 percent; and mobile homes, 10 percent. The median housing value of owner-occupied single-family dwellings rose from $18,500 in 1970 to $35,615 in 1978. The median housing values for districts 2, 3, and 8 are $73,163, $35,000, and $48,283, respectively.

E. ACCESSIBILITY. The Dreamy Draw project site is easily accessible from the Phoenix metropolitan area by paved surface roads. The major access road from the northeast to the southwest is Northern Avenue. The access road from the southwest to the northeast is the Paradise Valley Access Relief Road. This connects an area of commercial development, multiple-family, and single-family residences in the southwest to planned area developments and single-family residences in the northeast (32nd Street). The average traffic volume on Northern Avenue between 16th Street and 32nd Street is 29,000 vehicles per day (City of Phoenix Traffic Engineering Department). Dreamy Draw Drive is the major access road from the south, an area of commercial development, multiple-family, and single-family residences. No access road directly from the north exists, because this is the Phoenix Mountains Preserve area.

Easy access to the Dreamy Draw Dam site is also found on equestrian trails originating in the Phoenix Mountains Preserve to the north and south. The site is accessible through a large existing culvert crossing under the Paradise Valley Access Relief Road.

F. SOCIOLOGICAL PERSPECTIVE. The leisure needs of people should be identified in the planning process. The demographic characteristics of the project area show these users are basically urban consumers. The project area comprises 55 percent of the State's total population. High density populations, characteristic of the urban milieu, describe the Phoenix metropolitan area. Urban areas make specific demands on open space development; therefore, the planning process should recognize the needs and desires of the users they are planned to serve.

1. Recreation Land and the Urban Consumer. Recreation land should be a functional part of the overall environment, including the life styles of the community. Besides providing recreation opportunities, open space also preserves valuable scenic and natural resources.

The environmental features of the Phoenix Mountains Preserve offer exceptional opportunities for year-round outdoor recreation and high participation rates in a convenient location. The unique nature of the desert, typified in the areas surrounding Dreamy Draw Dam, offers the urban recreationist a chance to experience the natural environment close to home. Therefore, the resource benefits to the public are based on these natural characteristics. The primary goal for planning facilities at Dreamy Draw Dam should center on enhancing these values.

A 1972 document of the City of Phoenix, entitled An Open Space Plan for the Phoenix Mountains, states the following:

> With respect to appropriate recreation function, the Phoenix Mountains open space has exceptional value and potential as a major in-city preserve maintained primarily in its natural state. Secluded ecological communities should be protected from intensive intrusion; large areas should be restricted to hiking, riding and nature study. Organized recreation facilities should be kept to peripheral areas where they can be served by roads and utilities without undue disturbance of natural conditions.

2. The Urban Consumer. The city serves as a center for business, cultural, and social activities. According to A. H. Maslow, these meet many of the basic needs of survival, safety, and security, and also the higher level needs of comfort, joy, and pleasure. Open space also can be used to achieve these higher level needs. Recreation resources are used by the urban consumer for conducting activities he either finds there or brings with him to satisfy these inner needs. Highly developed consumer values of convenience and gadgetry, coupled with more leisure time and increased discretionary income, pressure the limited amount of easily accessible recreation resources available in the area.

Historically, the Phoenix Mountains Preserve, which includes the Dreamy Draw Dam area, has been used by hikers, equestrian riders, and picnickers. The Squaw Peak, and North Mountain picnic areas are used by people from all over the Phoenix Metropolitan Area. Squaw Peak is a focal point for thousands of hikers and joggers. Equestrian activities focus in the area west of Squaw Peak and the area south of Dreamy Draw. This is the location of training, boarding, and riding stables that use the extensive trail system in the nearby mountain park. Recent housing developments have made it more difficult to gain access to the park trails from this area. Consequently, the City of Phoenix has proposed development of an equestrian center northwest of Dreamy Draw as a new focal point for organized equestrian activities. The center will include show arenas, training rings, amphitheater, and related support facilities; it will attract persons from all over the valley.

The Dreamy Draw Dam site will provide an easily accessible assembly area within close proximity of the proposed equestrian center. The facilities at Dreamy Draw will complement and extend those activities proposed at the center. Various organized trail rides occur throughout the year, each requiring an assembly area. Spring in the mountain trail ride is an annual event, hosted by the Phoenix Mountains Preservation Council. In 1979, it drew 192 equestrians and 53 hikers to the Phoenix Mountains. Large equestrian groups are not uncommon for the area; each normally requires a picnicking/assembly area with provisions for horses. Hayrides are another popular pastime; stables are booked most weekend nights.

The tremendous population growth and the appeal of the western life style so evident in the Phoenix metropolitan area further the need for open riding space, trails, and meeting areas. Another quotation from the document, An Open Space Plan for the Phoenix Mountains, states the following:

> Horse activities are essentially a family affair and involve more family participation than most outdoor recreation activities. Participation is especially strong among adolescent and teen-age youths, and 4-H horse club programs are oversubscribed.
>
> Public acquisition and conservation of the Phoenix Mountains open space will afford Phoenix an exceptional opportunity to maintain and expand participation in this uniquely western form of outdoor recreation and to do so within the City without adversely affecting the value of adjacent residential areas.

Group picnicking activities are also a very popular pastime in Phoenix. Parks with group picnicking facilities, such as Squaw Peak south of Dreamy Draw, require advance registration and are booked to capacity on most weekend days and evenings. The groups range in size from 30 to 600 persons and range in activity type from square dancing to school groups. Dreamy Draw is expected to receive as much use as other group facilities in the area, at times requiring 2 months advance registration.

Close coordination with the City of Phoenix Parks Department provides the insight necessary for a workable and useful master plan. The city was able to identify and assign priorities to needs within its parks system. This enabled land use plans for the Dreamy Draw Dam area to be in accord with local recreation user requirements.

3. Recreation Activity Patterns. AORCC provides a comprehensive framework for determining existing and potential needs and activity patterns of users in the project area. Outdoor recreation activities among the urban-oriented residents of the project area characteristically are less physically demanding, participated in by a great number of families, and usually one-day outings. Rising gasoline costs have restricted much of the recreation participation to opportunities in or near the urban centers of Maricopa County. According to the 1978 AORRC study "50 percent of the State's population believe that a need exists for the development of urban outdoor recreational forms such as hiking, bicycling and horse trails *** 35 to 45 percent of the State's resident population perceives a need for urban-based scenic drives, motorbike and four-wheel tracks and urban campgrounds." Developing these types of activities satisfies three objectives: (1) provides for expanded outdoor recreation activities, (2) decreases urban-based pressure on rural resources and facilities, and (3) helps reduce the amount of energy (petroleum products) consumed in outdoor recreation related transportation.

As assessed by AORCC, the preferred recreation activities are sightseeing, picnicking, outdoor sports events, bicycling, outdoor zoo/museum, and pool swimming.

Factors Influencing Development

Chapter 6

FACTORS INFLUENCING AND CONSTRAINING RESOURCE DEVELOPMENT AND MANAGEMENT

A. GENERAL. The purpose of this section is to analyze the data presented in the previous sections in order to determine the problems and potentials for recreation development. Present limiting factors will affect development and management of the project area. The degree to which these factors limit use is discussed in the following sections.

B. CLIMATOLOGY. The climate of the Phoenix area is pleasant throughout the year, creating a year-round recreation season. According to the Arizona Outdoor Recreation Coordinating Commission (AORCC) 1978 Arizona Statewide Comprehensive Outdoor Recreation Plan, participation rates in outdoor recreation "in Arizona of residents and non-residents alike vary only modestly by season of the year." The combination of high and moderate temperatures, low relative humidities, and maximum amount of sunshine makes possible a year-round season of use for outdoor recreation facilities.

C. PHYSIOGRAPHY. The steep slopes characteristic of the Dreamy Draw Dam site will, in some instances, severely influence and constrain placement of facilities and trails. In this situation, however, the location and configuration of the borrow area lends itself to development of an amphitheater type setting between two large hills. Existing roads and trails can be used with slopes and changes in topography, adding interest and a challenge for joggers, hikers, and horseback riders.

D. GEOLOGY. The drainage basin upstream from the damsite is underlain chiefly by metamorphic rock. Quartzite, marble, and slate are present, but schist is the predominant rock type. Because of its abundance, schist can be used as decorative facing for structures. Much of the basin is comprised of bare rock. This might constrain development of hiking and jogging trails. The depth to bedrock is shallow in many areas, constraining use and placement of septic systems.

E. HYDROLOGY. The rapidity with which the basin will fill in the event of a standard project flood must be considered in planning facilities in the area. Specific criteria used to site facilities in relation to flood elevations will be discussed in detail in Chapter 8.

F. SOILS. The previous section on soils indicates types located in the Dreamy Draw Dam area as mapped by the U.S. Soil Conservation Service. Interpretation of each soil series determines its suitability for recreation development. These limitations are rated by degrees--slight, moderate, or severe. The limitations do not necessarily eliminate a specific use, but a severe limitation will escalate costs in overcoming the problem to be able to proceed with a particular kind of recreation development. Consequently, to avoid high capital outlays, caution must be taken in siting specific activities and facilities. Those soils with

slight limitations should be used whenever possible, although moderate limitations may be overcome with careful planning and design. Soil types in the project area and their limitations for recreation development are shown in table 3.

G. VEGETATION. Vegetation in the project area consists of a variety of desert plants and grasses. Dispersement of the vegetation is relatively sparse, except along the drainageways. Development in the basin must retain as much of the existing vegetation as possible.

H. WILDLIFE. The wildlife population within the Dreamy Draw Dam basin is sparse. Small mammals, amphibians, reptiles, and birds are quite mobile on and adjacent to project lands, and relatively few species can be found at any one time. Thus the wildlife on the project lands does not have the potential for wildlife management.

I. ARCHEOLOGY AND HISTORY. No evidence of any archeologic or historic remains has been uncovered in the Dreamy Draw basin. Although there are ruins of several kilns used in mining operations southeast of the basin, the location is well removed from the project lands. The City of Phoenix has preserved this site with future plans to investigate the ruins.

J. MINING. The mining test holes excavated in the basin will be filled to prevent safety hazards to those using the project lands. The sites of roads formerly used for mineral extraction influence recreation development in that these existing roads may be employed for automobile access and, whenever possible, for the siting of trails. This will tend to decrease the costs associated with developing new roads and trails.

K. ROADS IN THE PROJECT AREA. Unimproved dirt roads thread throughout the basin. These roads lend themselves to the potential for a trail network.

L. ACCESSIBILITY. The Dreamy Draw Dam basin is relatively accessible by motorized vehicles, equestrians, and pedestrians. Two major roads, Northern Avenue and Paradise Valley Access Relief Road, encircle the basin and can be reached by a number of local streets, such as 19th and 32nd. To prevent unauthorized access of the basin by motorized vehicles, standard guardrails at access points are required.

The City of Phoenix maintains a graded dirt road from Dreamy Draw Drive to the spillway. The road erodes, and ruts are apparent after heavy precipitation and limited runoff. Therefore, the road should be paved to provide permanent access to the basin.

Table 3. Soils Limitations for Selected Recreation Development.

Soil Series and Map Symbols	Areas				
	Campsites	Lawns and Golf Fairways	Paths and Trials	Picnic sites	Playgrounds
Antho: AoB	Slight to moderate: 15 to 25% gravel	Moderate: gravelly sandy loam 15 to 25% gravel; 1 to 3% slopes	Slight to moderate: 15 to 25% gravel	Slight to moderate: 15 to 25% gravel	Moderate to severe: 15 to 25% gravel; 1 to 3% slopes
Cavelt: CeC	Moderate: gravel in surface layer	Severe: hardpan at depth of less than 20 in.; available water capacity less than 3.75 in. to depth of 5 ft.	Moderate: gravel in surface layer	Moderate: gravel in surface layer	Severe: gravel in surface layer; at hardpan depth of less than 20 in.
Rock Land: Ro	Severe: slopes of 9 to 75% exposed rock on 50 to 70% of area	Severe: slopes of 9 to 75%; exposed rock is 50 to 70% of area	Severe: slopes of 9 to 75%; exposed rock is 50 to 70% of area	Severe: slopes of 9 to 75%; exposed rock is 50 to 70% of area	Severe: slopes of 9 to 75%; exposed rock is 50 to 70% of area

Soil series taken from a general soils map.

Note: Within a soil series, specific sites have varying amounts of other soil types. Onsite soil investigations show appropriate sites for development.

Sources: U.S. Department of Agriculture, Soil Conservation Service, 1974

The double-barreled equestrian and automobile underpass along this access road serves a dual purpose as a culvert for drainage of flows emanating from the outlet. The flows from the outlet could be as great as 220 ft^3/s (6.2 m^3/s) in the event of a standard project flood and, as such, would pose a threat to those attempting to use the roadway. Thus, an alternate to the main access road should be provided to exit the basin in times of flooding.

Underpass tunnels beneath Paradise Valley Access Relief Road connect to trails from the southern portion of the Phoenix Mountains Preserve and allow safe and easy access for those on horseback and foot south of the basin. No underpass exists beneath Northern Avenue. Equestrian and pedestrian access from the northern portion of the Phoenix Mountains Preserve to the basin is hazardous because travelers must cross the surface of the high-speed Northern Avenue. So an equestrian underpass is proposed to cross under Northern Avenue.

M. EXISTING LAND USE. Adjacent to the Dreamy Draw Dam basin on the north and south is the Phoenix Mountains Preserve. Development in the basin will complement the characteristic elements of those within the preserve. These include openness, a low-intensity-recreation development including trails, and preservation of the natural desert mountain beauty.

The residential areas near the basin and the high-speed roads surrounding the project lands also influence development and the types of facilities proposed.

N. VISUAL ANALYSIS. The visual quality aspects related to the development of recreation and associated features in Dreamy Draw Dam basin are summarized below:

1. The construction of new roads and parking areas will impact the visual esthetics. New landforms created by cuts and fills may add to or detract from the visual quality. Definite consideration must be given when these elements occur along the rolling slopes on both sides of the wash and on the project lands.

2. The scale of any development in the project area should be consistent with the visual character of the wash area as it is now. In essence, the activity areas should be designed to complement the landscape.

3. Generally, the recreation value of the project depends largely on the scenic character of the Dreamy Draw Dam area. Consequently, because of the narrow expanse of the wash area and relatively sparse vegetal cover, all stands of plant material become valuable amenities that should be preserved and used in the design of all facilities.

O. AREA OF INFLUENCE. The area of influence is defined as the region that is affected by the project. Local use will originate within a 30-mile (48-km) radius of the project; this includes most of Maricopa County and the Phoenix metropolitan area. Emphasis will be on day use activities.

P. DEMOGRAPHIC CHARACTERISTICS. The socioeconomic factors indigenous to a geographic area influence the demand for certain types of outdoor recreation activities.

The following demographic characteristics demonstrate a need for more outdoor recreation facilities. The Dreamy Draw Dam site is in a fast-growing area. These people new to the area most likely will want individual and family-type outings at a minimal cost and close to home. These needs influence the kind of recreation-resource development proposed for the damsite.

1. Existing Population. Ninety-five percent of the population of Maricopa County is in the Phoenix Standard Metropolitan Statistical area, one of the fastest growing metropolitan areas in the nation. The 1978 figures from the Arizona Statistical Review give the population at 1,346,500; in 1960, the figure was 663,510. The factors contributing to this doubling of the population are natural increases, migration to the southwest, and the favorable climate. This growth in population has increased the pressure on available outdoor recreation sites in the area.

2. Projected Population. Projected population for Maricopa County is as follows:

Year	Population
1980	1,431,000
1985	1,629,000
1990	1,802,000
1995	2,002,000
2000	2,181,000

Because this growth pattern will continue to exert pressure on outdoor recreation sites in Maricopa County, there is need for additional development.

3. Age. A 1977 consumer survey reported the median age was 27.1 years in the county and approximately 30 years in districts 2, 3, and 8. More than 49 percent of the population is 16 to 64 years old. The large group of young adults in the area is showing a change in recreation values. This group is becoming less achievement-oriented in recreation pursuits; they prefer individual and family activities to team-type activities. With the change in focus, demand will increase for those sites offering alternative sources for outdoor recreation pursuits.

4. Income. The Arizona Outdoor Recreation Coordinating Commission (AORCC) concludes that people with family incomes ranging from $10,000 to $15,000 are the most active participants in outdoor recreation in Arizona.

The three districts show a median income of over $23,000. Available discretionary income increases the possibility of pursuing outdoor recreation. Figures predict continued increases in household and per-capita incomes. Inflation must be taken into account, for it causes reduced real incomes and smaller household budgets for entertainment and travel.

5. Mobility. Increased mobility is evident throughout Maricopa County. There is one vehicle for every 1.3 persons. This makes travel a possibility for leisure activities, although travel restrictions such as lowered speed limits and higher-priced gasoline will restrict this travel to closer-to-home outdoor recreation sites. Energy-conserving recreation pursuits will become more evident because of these factors.

6. Residence. A distinguishing factor of Phoenix is the urban sprawl--the planned and unplanned development. This kind of growth rapidly consumes open space and decreases the potential land available for outdoor recreation facilities. The proposed recreation development at Dreamy Draw will contribute to the preservation of open space for the recreation needs of the community. The communities house urban consumers devoted to recreation pursuits. The project will offer recreation opportunities close to residential development.

7. Leisure Time. According to estimates, increased productivity will reduce the average work week to 36 hours. The 3-day weekend, already created by some national holidays, and the 4-day work week, that eventually may be adopted by many businesses, will increase the demand for recreation activities. Available leisure time is growing, the consequences are more-intensively used outdoor recreation sites and an increase in demand for diverse recreation activities.

8. Education. Learning can further the concepts of physical fitness and conservation ideals with an increase in appeal for these types of activities. The median education level for the county is 12.9 years, District 2 is 16.3 years, District 3 is 13 years, and District 8 is 14.5 years.

Q. OPPORTUNITIES FOR ACTIVITY. The recreation facilities will offer more than just a scenic view. They are designed to provide a sense of recreation. Picnicking, horse trails, and jogging paths are also recreation opportunities open to the urban consumer. Increasing the number of recreation facilities available will increase participation and future demand.

R. UTILITY LOCATIONS. The presence or absence of utilities close to the project lands affects resource development. A 48-inch main water line traverses the basin and can be tapped for potable water for recreation use. Electric lines are located approximately 2 miles from the basin at 19th Street and Northern Avenue. The electrical lines connecting this location to the basin must be run underground in compliance with Phoenix's regulations. There are no sewage lines close to the project area, so an alternate waste disposal system must be provided.

S. TYPE, LOCATION, AND EXTENT OF EARTH BORROW AND SPOIL AREAS, AND POLLUTED SITES ON OR ADJACENT TO PROJECT LANDS. The area adjacent to the Dreamy Draw Dam site is the Phoenix Mountains Preserve. This does not influence or constrain development in terms of borrow, spoil, or polluted areas because of the natural status of these lands. However, within the basin area there are two locations of earth borrow. The one used during construction of the dam is directly at the base of the dam on the upstream side and has been restored. The other existed prior to construction and is located northeast of the spillway. It remains severely cut. This influences the choice of location for recreation facilities to use this cut advantageously.

Pollution on the site consisted primarily of solid wastes, such as used furniture and appliances, tires and trash, that have been disposed of or dumped within the project area. It is the responsibility of the City of Phoenix to clean up this unauthorized dumping.

T. ADAPTABILITY OF SPILLWAY AND OTHER PROJECT STRUCTURES FOR PUBLIC USE. As mentioned in the visual analysis section, the spillway has been excavated and is relatively level. Automobiles and house trailers use the spillway for parking and to get to the heart of the basin where the various trails are.

U. ENVIRONMENTAL IMPACTS. Because of construction activities, temporary environmental impacts will occur at the Dreamy Draw Dam site. Following is a discussion of these impacts.

a. Air Pollution. Temporary air pollution in the form of increased particulates such as dust will occur as a result of construction activities. These activities may include the construction of recreation facilities that may require grading and filling operations. This impact will be minimized by requiring the contractor to maintain all excavation areas, borrow areas, roads, and trails free from dust that would be a hazard or nuisance to others. Methods of stabilization include sprinkling, chemical treatment, light bituminous treatment, or similar methods.

b. Noise Pollution. Temporary noise pollution will occur during construction and grading operations associated with recreation development. This noise may affect wildlife and recreationists in the Phoenix Mountains Preserve area for the duration of construction.

V. APPLICATION OF PUBLIC LAW 89-72 - COST SHARING. In accordance with Federal policy based on House Committee Report No. 254, which accompanied Public Law 89-72, cost sharing of recreation is required between the Federal Government and local interests. Under this policy, and the memorandum dated 12 June 1976 from Victor V. Veysey, Assistant Secretary of the Army (Civil Works), local interest groups must meet the following requirements:

a. Acquire in their names, and dedicate to public outdoor recreation use of the economic life of the basic flood control improvements, lands needed for recreation development, and insure public control of the development, with appropriate credit, as given below in subparagraph b.

b. Where the appraised value of the land so provided amounts to less than 50 percent of the total first cost of the recreation development, make additional contributions sufficient to bring the non-Federal share to at least that level; additional contributions may consist of the actual cost of carrying out an agreed-on portion of the development, or a cash contribution, or a combination of both.

c. Operate, maintain, and replace without expense to the Federal Government the recreation areas and all facilities installed pursuant to the agreement.

d. The City of Phoenix has expressed its intent to accept all local responsibilities with regard to the cost-sharing requirement. The letter of intent from the City of Phoenix is enclosed as appendix 2. A draft cost-sharing agreement with the City of Phoenix, is enclosed as appendix 1.

e. Cost-sharing requirements also include the development of the Feature Design Memorandum and Plans and Specifications.

Coordination

Chapter 7

COORDINATION WITH OTHER AGENCIES

During the development of the master plan and feature design memorandum for the Dreamy Draw Dam basin, close and continuous coordination has been maintained with Federal, State, and local agencies that have interests and responsibilities in the fields of public recreation, fish and wildlife, preservation of archeologic and historic resources, and environmental quality. A multiple-agency recreation task force was formed in September 1973 to plan and coordinate recreation development associated with the New River and Phoenix City Streams flood control project. The task force is composed of representatives of various Federal, State, and local agencies and interest groups, including the following:

U.S. Army Corps of Engineers
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Soil Conservation Service
Arizona Game and Fish Department
Arizona Outdoor Recreation Coordinating Commission
Arizona State Horsemen's Association
Arizona State Land Department
Arizona State Parks Department
Arizona Department of Water Resources
Flood Control District of Maricopa County
Maricopa County Parks and Recreation Department
Maricopa County Planning Department
Avondale Parks and Recreation Department
Glendale Parks and Recreation Department
Mesa Parks and Recreation Department
Peoria Parks and Recreation Department
Phoenix Parks, Recreation, and Libraries Department
Tempe Parks and Recreation Department
Deer Valley Community Council
Deer Valley Planning Committee
Jade Park North Homeowners' Association
Saddleback Meadows Homeowners' Association

The task force has been instrumental in the formulation of the overall land use concepts and development plans for the Dreamy Draw Dam basin. In addition to the close coordination with the recreation task force, the development plan has been presented to the Citizens' Advisory Board of the Flood Control District of Maricopa County, Arizona Hiking and Equestrian Trails Committee, Maricopa County Hiking and Riding Trails Committee, Maricopa County Parks and Recreation Commission, Paradise Valley Planning Committee, City of Phoenix Parks and Recreation Board, and Phoenix City Council. These groups support the overall development plan.

The advice and expertise of individuals and groups (such as experienced equestrian riders, hikers and joggers, user organizations, and stable owners) also was used in developing plans for various facilities in Dreamy Draw Dam basin.

Coordination with the recreation task force and other interested parties will be continued throughout all future phases of development and implementation of the Dreamy Draw Dam basin development plan.

Physical Plan

Chapter 8

PHYSICAL PLAN OF DEVELOPMENT

A. GENERAL. The proposed land use plan for the Dreamy Draw Dam basin represents a synthesis of the environmental, social, and economic factors discussed in Chapters 4 and 5 (pl. 13). The plan reflects the limitations, interpretations, and analysis of the elements examined in Chapter 6 that outlined the factors influencing development. Decisions regarding land use result from systematic analysis of many interrelated and interdependent factors ranging from social and economic considerations to physical characteristics. Although many of these components represent land use constraints, the physical elements such as slope, soils, climate, and wind direction ultimately determine specific site use.

B. LAND USE PLAN. The land use plan (pl. 14) is in accordance with legislative authorities and project authorization. Plans for the development and management of resources in the Dreamy Draw Dam basin have been prepared in concert with the requirements of the National Environmental Policy Act of 1969 (Public Law 91-90). In addition, allocation of land use and determination of management policies and practices have been developed in conjunction with the City of Phoenix to insure compatibility, flexibility, and optimum use of resources.

The land uses listed in the following subsections have been designated for the Dreamy Draw Dam Project.

1. Recreation - Intensive Use. Lands in this category are suitable for development for public use in pursuit of intensive recreation activities. Intensive recreation use areas may be developed for uses compatible with the overall recreation development plan. The uses might include, but are not restricted to, roads, sports facilities, trails, and permanent structures. All permanent structures must be placed above the 100-year flood elevation of 1396.7 feet (419 m).

These lands will be developed by the Corps of Engineers and the City of Phoenix. Operation and management of the recreation facilities are the responsibility of the City of Phoenix, while that of the flood control features rest solely with the Flood Control District of Maricopa County.

2. Recreation - Low Density Use. This category includes lands designated as low-density recreation areas for public use. Lands allocated to such use may act as open space or buffer zones between uses and may delimit areas incompatible with intensive development because of physical characteristics. Because of this objective for development, limiting factors include the following: degree of slope, amount of native vegetation, habitat areas for wildlife, lands close to the existing high speed roads (for safety reasons), or lands subject to frequent flooding. Because of these factors, improvements on low-density recreation areas should be limited. Taking environmental

elements into account, appropriate development might include trails and simple facilities not subject to damages by water. Low-density recreation uses may overlap with project operational lands, where feasible. Development decisions regarding these areas will be made by the Corps of Engineers and the City of Phoenix. Low-density recreation areas will be operated and maintained by the City of Phoenix.

3. Project Operations. Lands in this category include those on which project operational structures are located and are necessary for the safe, efficient operation and management of flood control features of the Dreamy Draw Dam project. These lands have been developed by the Corps of Engineers and the Flood Control District of Maricopa County.

Project operation lands include the main embankment, dike, spillway, service road, and areas subject to frequent flood inundation. The lands subject to frequent flooding may be used for low density recreation, such as trails, but because of safety and replacement factors these lands may not be used for structural recreation facilities. Appropriate uses include trails, nature walks, and other activities not requiring facilities that, in the event of a flood, could impede the safe operation of the flood control features. Operation and management of project operation lands are the responsibility of the Flood Control District of Maricopa County.

While the land use plan developed as a result of the influence of environmental, social, and economic elements, specific methods of land management evolved as an adjunct of the land use plan. These resource management objectives are discussed in Chapter 11.

C. RECREATION CONCEPT. The site plan for the Dreamy Draw Dam basin was developed within the framework of the following basic planning principles:

- The site plan must reflect the optimum practical use of the land, given the constraints of compatibility with the environmental, social, economic, and safety aspects of the area.

- The plan must be farsighted in scope, while allowing flexibility to accommodate changes or modifications that might arise.

- The site plan must be well coordinated with local interests to insure that recognition of local values and perspectives are incorporated into the plan throughout the planning process.

The approach utilized in developing the site plan was to use the summation of the land use plan, the design criteria, and the management objectives (discussed in Chapters 8, 9, and 10, respectively) to guide the specifics of the site plan. Plans reflect local needs and desires for recreation and open space opportunities, as identified by the City of Phoenix, the Recreation Task Force, Arizona Outdoor Recreation Coordinating Commission, and local interest groups. The proposed development will be located on available project lands and will take

advantage of existing site amenities, as well as adjacent complementary uses. Optimum facility development within the basin will help satisfy demands for such activities, but the existing local recreation demands will continue to exceed the maximum practical use of the proposed facilities.

The Dreamy Draw Dam basin development plan was prepared in conjunction with the general planning concepts for the zoning and development of the City of Phoenix. The site plan and facility design were developed in consonance with the desert mountain characteristics of the surrounding Phoenix Mountains Preserve. Dreamy Draw Dam basin will serve as a trail assembly area and point of departure for those using the trail system through the Phoenix Mountains Preserve. Trails and underpasses in the basin will provide vital links to the trails of the surrounding environs.

As mentioned in Chapter 6, several factors and design criteria influenced the development of the site plan for Dreamy Draw basin. The primary considerations and criteria will be briefly noted below to indicate their impact on specific elements of siting and design.

The Dreamy Draw Dam basin is surrounded by the Phoenix Mountains Preserve and links the preserve with an existing horse-riding stable and a proposed equestrian center. At present there is little residential or commercial development within the mountain areas outside the basin. The undeveloped areas within the mountain preserve are to remain in a relatively natural open state with only about 7 percent of the entire mountain preserve planned for any type of development. The objectives outlined in the master plan for the Phoenix Mountains Preserve state that the development within the boundaries of the preserve might include outdoor recreation and education activities, provided use areas and facility designs insure compatibility with open space values, preservation objectives, and adjoining private property uses.

Using the above-mentioned factors and the planning considerations enumerated in the land use plan, several concepts for recreation development were prepared as alternatives to the plan presented in the General Design Memorandum - Phase I. Advantages and disadvantages of physical, environmental, and social factors for each alternative were analyzed. As a consequence, the proposed plan represents a composite of features from several alternatives. In general, the proposed site plan envisions the use of the basin primarily as a trail assembly area (pl. 3). Major elements of the plan include a group-picnicking ramada complex with a paved assembly area equipped with a hookup for a public address system and a restroom, individual picnicking ramadas, hiking and riding trails with an underpass, access roads, and parking. These features and their locations are described below.

1. Group-Picnicking Ramada Complex. Hiking and riding trails interlaced throughout the preserve traverse the detention basin and make the basin a desirable location for a gathering area. The gathering area will consist of a group-picnicking ramada complex, a concrete assembly

area with a public address system, restroom, horse-tie-up area, and horse-watering trough. The group-picnicking ramada complex is on the southeast side of the basin adjacent to Paradise Valley Access Relief Road. The ramada complex is north of the upstream portion of the spillway in one of the borrow areas scarred from construction of the dam. An amphitheater effect is created by arranging the five ramadas in a semicircular pattern at elevation 1401 feet (427 m) with the assembly area in front of and at a lower relief than the ramadas.

Associated with each of the five ramadas will be four tables with benches, two barbeques, and trash receptacles. The ramadas will be made of concrete with schist facings on the support columns to blend the architectural style with the surrounding native schist mountains. Each ramada will measure 38 feet (11.2 m) by 31.3 feet (9.2 m) by 8.5 feet (2.9 m). The floor of the ramadas will be natural base to maintain the desert character and for ease of maintenance. Four tables with benches constructed of concrete will be housed under each ramada. The tables will be 20 feet (6.1 m) by 3 feet (.9 m) by 4 inches (101.6 mm), while the benches will be 1 foot (304.8 mm) wide. The benches will not be attached to the tables. Table edges will overhang their legs to allow wheelchairs to pull up to the ends. Lighting will be provided at the group picnicking ramada complex. The 20 tables will accommodate approximately 500 persons at a time.

Two barbeques will be built on the south side of each of the five ramadas. Each barbeque will be approximately 15 feet (4.6 m) by 18 inches (457.2 mm) by 3 feet (.9 m). To blend with the design of the ramadas, the barbeques also will be concrete with schist facing. Grills will be steel. Trash receptacles will be concrete.

A 40-foot (12.2 m) by 70-foot (21.3 m) concrete assembly area will be located to the northwest of--and at an elevation 2 feet (.6 m) lower than--the picnic ramadas. Hookups for a public address system will be provided at the assembly area. The assembly area will be highly visible from the picnic ramadas and can be used for activities such as stage events, square dancing, and volleyball. A 5-foot (1.5 m) diameter fire ring will be located on two sides of the assembly area. The fire rings will be made of metal and supported by metal legs. The fire rings will provide a safe area for campfires.

The restroom will be west of the picnicking ramadas at an approximate floor elevation of 1414.5 feet (424.3 m) with a lower floor elevation of approximately 1405.5 feet (421.6 m). The exterior of the building will be concrete with schist facing. Men's and women's restrooms will be separated by a storage area.

Restrooms will be equipped with grab bars to accommodate physically handicapped persons. A vandalproof mirror will be mounted over each of four lavaratories (two in the men's and two in the women's). A service sink will be installed in the storage area. Hand dryers will be recessed into the walls to prevent vandalism. Ventilation will be provided by an opening at the top of the side walls. Waste disposal will

be accomplished by an organic waste disposal system. The restrooms will be lighted. A drinking fountain will be located outside the restroom building, as will the trash containers.

A horse-watering trough and tie-up area will be located north of the assembly area at approximately elevation 1390 feet (424 m). This area is adjacent to the informal parking area and easily accessible from the trails that traverse the basin. It is also visible from the group picnicking ramada to allow equestrian riders to watch their animals while gathered for an assembly or picnic. A 200-gallon (757 l) watering trough will be about 5 feet (1.5 m) in diameter and 3 feet (.9 m) high. The trough will be made of concrete and have an automatic filler. The horse tie-up area will consist of three pipes 60 feet (18.3 m) long by 4 feet (1.2 m) high, spaced approximately 35 feet (10.7 m) apart. The hitching pipes will be galvanized hollow pipes. About 100 horses can be tied to the hitching pipes at any time.

2. Individual-Picnicking Ramadas. Three individual-picnicking ramadas will be located north and east of the group-picnicking ramada complex. Each ramada will be above the 100-year-flood elevation. With the exception of size, the design of the individual ramadas and associated facilities will be basically the same as that of the group ramadas. Individual ramadas will be approximately 19 feet (5.8 m) by 16 feet (10.6 m) by 8.5 feet (2.9 m), each with two tables and benches about 10 feet (3 m) long. One barbeque about 10 feet (3 m) by 18 inches (457.2 mm) by 3 feet (.9 m) will be furnished for each individual ramada. The individual ramadas will be lighted.

3. Hiking and Riding Trails with Underpasses. Numerous trails wind through Dreamy Draw basin and connect with trails originating in the Phoenix Mountains Preserve via underpasses beneath the Paradise Valley Access Relief Road. These trails require no additional work. But equestrian riders using trails that weave through the basin and head toward the northern portion of the Phoenix Mountains Preserve must cross Northern Avenue. Not only is the pavement slippery for horses, but the visibility for both the riders and automobile drivers is poor because of curves in the road. These factors, coupled with the high-speed traffic, pose a serious safety problem for riders attempting to cross Northern Avenue. Thus an equestrian underpass will be constructed beneath the road just east of the Dreamy Draw Dam sign. The underpass will be excavated in an existing wash. Adequate drainage will be provided to compensate for replacing the existing 42-inch (1067 mm) drainage culvert that passes under Northern Avenue at the location planned for the equestrian underpass. The underpass will be of similar construction to those built by the City of Phoenix that pass under Paradise Valley Access Relief Road and 19th Street. The underpass will be made of corrugated steel plates to form an elliptical-shaped tunnel with approximate dimensions of 11 feet (3.3 m) by 13.2 feet (4 m). The floor of the underpass will be backfilled with native soil to the depth of about 1 foot (.3 m) to protect horses from slipping (pl. 15).

Jogging trails are planned for the basin and the downstream side of the dam. Almost all trails will use the roads cut during construction of the dam. Rock boulders and signs will mark the jogging trails and delineate these from equestrian trails. Trails extending beyond the flood control project boundaries will be constructed at local expense. The network of jogging trails associated with the development of the Dreamy Draw Dam basin will provide 2.2 miles (3.5 km) of trails.

4. Access Roads and Parking. Ingress and egress will be provided along the alinement of the existing road that intersects Dreamy Draw Drive and leads to the spillway (pl. 3 & 22). The City of Phoenix graded the road and installed the double-barreled equestrian underpass beneath the Paradise Valley Access Relief Road. The access road will be widened to approximately 30 feet (9.1 m); it will have two 12-foot (3.6 m) lanes with 3 foot (.9 m) shoulders. The road will be paved with asphalt from Dreamy Draw Drive to the downstream end of the spillway. At the point where the road crosses the streambed, an 85-inch (2 159 mm) by 54-inch (1 371 mm) corrugated metal pipe arch culvert will pass water from the outlet under the road. The culvert will be designed to accommodate the maximum probable discharge from the outlet (pls. 3 & 16).

A number of alternative alinements for an emergency exit road were developed and analyzed with the assistance of the City of Phoenix Traffic Engineering and Parks and Recreation Departments. The alinement selected provides for an emergency exit road from both parking areas onto the Paradise Valley Access Relief Road at a point south of the group picnicking ramadas. The exit road will consist of a 12-foot (3.6 m) one lane road with no shoulders. The exit will be composed of compacted natural soil materials. No paving is recommended because the road will not be used often and the local sponsor wishes to prevent further paving in the desert environs. After initial construction, grading and maintenance of the road will be the responsibility of the City of Phoenix. Interpretive and directional signs will inform visitors that the emergency exit road is to be used only during times of flooding in the basin.

A service road will be provided for City of Phoenix maintenance crews. The service road will use the main access road and spillway to approach the pedestrian and service vehicle bridge that will span the wash between the spillway and group-picnicking complex. The road will be composed of natural soil materials and will be approximately 10 feet (3 m) wide. This road will allow service vehicles easy access to the restroom and group-picnicking complex for routine maintenance and future repairs.

Several alternative locations for parking were evaluated. They included parking areas north and south of the spillway, the spillway itself, and one area immediately south of and adjacent to the dam. After considerable discussion of factors relative to the safety of the dam, structural integrity of the spillway, and environmental concerns, it was decided to recommend informal parking just west of the horse

tie-up ar[illegible] (pl. 3). No bumper curbs, striping, nor other markings will be provided for this area. The parking area will be cleared of vegetation, but will not require grading or paving. This informal parking area might be reached by way of the access road, leading over the spillway and into the basin.

Overflow parking will be provided adjacent to the south side of the dam, east of the outlet works (pls. 3 and 23). This area is relatively flat, requiring only minimal leveling, and devoid of plant material. Visitors who cannot find space to park in the informal area convenient to the recreation facilities can return, by way of the spillway, to park in the overflow area just off of the access road.

Signs will direct visitors to the parking areas provided, and will notify them that no parking is allowed on the spillway itself. The local sponsors have agreed to take responsibility for signing the area and enforcing the signing regulations.

5. Site Work and Landscaping. Minimal site restoration and enhancement will be required for the Dreamy Draw project. A semicircular scar created during construction provides a desirable setting for the group-picnicking complex. The ground level immediately southwest of the group-picnicking complex is higher than that on the southeast. A berm or mound will be built to continue the higher elevations around the back or south side of the ramadas on the east. Approximately 7500 yd^3 (5734 m^3) of fill will be required. The berm will act as a buffer to the ramada users from traffic noise and visibility. The berm will be landscaped with desert shrubs such as the following:

Botanical Name	Common Name
Acacia farnesiana	Sweet Acacia
Cercidium floridum	Blue Palo Verde
Parkinsonia aculeata	Mexican Palo Verde
Prosopis glandulosa torreyana	Chilean Mesquite
Larrea divaricata	Creosote Bush
Carnegiea gigantea	Saguaro Cactus
Ferocactus wislizenii	Fishhook Barrel Cactus

The area north of the paved assembly area will be recontoured to create a gentle slope and better drainage of the area. This will require approximately 2000 yd^3 (1529 m^3) of fill.

Some site work may be necessary for construction of the individual picnic ramadas. Minor grading will be required for short segments of the trail system.

The access, emergency exist, and service roads will require a moderate amount of earthwork. The access road will require 11,300 yd^3 (8645 m^3) of material. Construction of the emergency exit road will

produce 4800 yd^3 (3670 m^3) of material; 394 t (3940 q) of material will be required for construction of the service road. The informal and overflow parking areas will not require any earthwork.

Construction of the equestrian underpass beneath Northern Avenue will require excavation of about 1222 yd^3 (934 m^3) of material.

Any additional fill material required will be obtained from a quarry site approximately 4 miles (6.4 km) southeast of the project.

D. FUTURE DEVELOPMENT. Because of the projected increases in outdoor recreation participation, it is likely a need will develop to expand the recreation facilities at Dreamy Draw Dam. As a support facility for the Phoenix Mountains Preserve, future development should be consistent with the land use plan (Chapter 8) and flood control purposes. Possible expansion may include, but is not restricted to, trail expansion and improvement, additional picnicking ramadas, restrooms, parking spaces, and an exercise course.

The equestrian trails, while primarily serving the Phoenix Mountains Preserve, also are vital access links between Squaw Peak Stony Mountain Park and the North Mountain Park areas. With the advent of the City of Phoenix's proposed equestrian center north of Dreamy Draw Dam, the trails in this area will realize increased and possibly intensive use by equestrians and hikers traversing the basin for access to other portions of the preserve. This condition will warrant trail expansion and improvement to accommodate increased usage.

As a trail assembly area is developed, a substantial growth in usage will also necessitate an expansion of sanitary, parking, and picnicking facilities. This will be necessary not only for those engaged in horseback riding and hiking, but also to accommodate groups engaged in such activities as square dancing and hayriding.

As the trend for physical fitness grows in popularity, a need may develop for a physical fitness course to augment the recreation facilities at Dreamy Draw. An exercise course will consist of approximately 20 stations at varied intervals along a 1-1/2- to 2-mile (2.4- to 3.2-km) looped trail. Each station will illustrate a different exercise designed to strengthen muscles, improve coordination, and exercise the respiratory system. The recreationist might choose to jog, run, or walk between stations. The course should be compatible with flood control features, the surrounding development, and environmental features.

E. SCHEDULE OF DEVELOPMENT. Preparation of plans and specifications for development of Dreamy Draw Dam basin will be initiated in the first fiscal year for which funding is available following approval of the master plan. Construction of recreation facilities and associated features is planned for the fiscal year succeeding completion of plans and specifications. The cost of initial development of facilities, and future development, if found to be warranted, will be cost shared

between the City of Phoenix and the Corps of Engineers. Responsibility for operation, maintenance, and replacement of facilities will be borne by the City of Phoenix.

F. MARKET AREA. The purpose of this section is to establish the recreation supply and demand rates for the Dreamy Draw Dam site. Constructed as a flood control detention structure, the Dreamy Draw Dam contains no permanent water storage pool. The proposed recreation activities are not water oriented, therefore the procedures outlined in ER 1120-2-403 for water-filled reservoirs are not applicable. The following section describes the procedures used for determining supply and demand rates for facilities at Dreamy Draw Dam.

Because the Dreamy Draw Dam site is in the Phoenix Mountains Preserve, and so will have high use rates, the primary market area is Maricopa County. According to the 1979 Arizona Statistical Review, this county had a population of 1,453,500. Population projections show almost a doubling of population to 2,443,000 by 2000.

The market area recreation demand for any single recreation activity equals the per capita participation rate for the activity, multiplied by the market area population. The sum of the recreation demands for the individual recreation activities equals the project's total market area recreation demand.

The existing recreation supply in the market area for the proposed activities are taken from the resource inventory of the 1978 Arizona Statewide Comprehensive Outdoor Recreation Plan (SCORP). By determining how many participation days each recreation facility can supply and then multiplying this amount by the number of existing facilities, the recreation supply of that activity can be calculated. Subtracting this known supply from the recreation demand for the activity reveals the deficiency in participation days for that activity. This number illustrates needs not being met at this time by existing recreation facilities in the market area.

Table 4 details the present recreation demand, supply and supply deficit for each activity: picnicking, horseback riding, hiking, jogging and hayriding. Table 4 also shows the recreation supply to be provided by the proposed project. The project supply was computed by the land capacity formula as shown below. The formula is used to find the maximum number of recreation days that can be provided by the project annually. The number of recreation days now provided on site are then subtracted from this figure to yield the net maximum annual recreation days provided by the project. The existing recreation use of project lands is found by employing the land capacity formula and estimating usage onsite before construction of the recreation facilities described in this report. Net annual recreation days are calculated because benefits for recreation uses that already took place without the project should not be attributed to project development.

$$ARD = \frac{RD \times N}{W \times M}$$

AD = DxUxT
AD = Activity days
D = Density, the number of people that can be comfortably accommodated in a single unit.
U = Units, the number of one type of recreation facility at a site.
T = Turnover rate, the number of groups that can be expected to use a facility in 24 hours.

$$RD = \frac{AD}{R}$$

RD = Recreation days
R = Ratio of duplication of activities (1.2)

ARD = Annual recreation days
N = Number of weekend days in the peak month of recreation use (9).
W = Percentage of peak month use that takes place on weekends (50-75%)
M = Percentage of annual recreation use that takes place during the peak month (14-18%)

The computations show that the project can satisfy only 1.3 percent of the total market area recreation deficit.

For further detail, see the following: "Phoenix, Arizona, and Vicinity (including New River); New River and Phoenix City Streams, Arizona, Design Memorandum No. 4 Overall Master Plan".

Table 4. Market-Area Recreation Demand, Supply, Deficit, and Project Supply.

Activity	Present Demand	Existing Supply*	Present Deficit	Project Supply
Picnicking	13,372,200	11,488,200	1,884,000	62,400
Horseback Riding	3,197,700	1,462,500	1,735,200	10,400
Hiking	3,314,000	81,000	3,233,000	5,600
Jogging	726,800	541,500	185,300	1,800
Hayride	130,800	87,300	43,500	9,300
TOTAL	20,741,500	13,660,500	7,081,000	89,500

*Data from 1978 Arizona SCORP Resource Inventory

Design Criteria

Chapter 9

FACILITY LOAD AND OTHER DESIGN CRITERIA

A. GENERAL. Components of the overall recreation development have been designed in accordance with Department of the Army ER 1110-2-400, Engineering and Design - Design of Recreation Sites, Areas, and Facilities. Specific design criteria for elements of the development plan for the Dreamy Draw Dam basin are discussed in this chapter. The criteria, together with the physical plan chapter, is intended to serve as a guide for the final design of facilities and preparation of plans and specifications.

B. SITING. Site restrictions have been imposed to insure development in the basin is consistent with flood control requirements and visitor safety. All development, with the exception of part of the access road, will be within the available rights-of-way required for the flood control project. These lands are managed by the City of Phoenix and the Flood Control District of Maricopa County.

As mentioned in Chapter 2, Project Description, the relatively small drainage area causes the basin to fill rather rapidly during a standard project flood or lesser floods. Therefore, site restrictions specify all facilities will be located above the 50-year flood elevation of 1393.8 feet (418 m); all facilities will be on the spillway side of the main streambed; all facilities will have easy access to the parking area; and the parking area will have an emergency exit that is at the spillway level or higher (pl. 3).

C. ARCHITECTURAL CHARACTER. The architectural style attempts to preserve and enhance the character of the existing natural environment. Basic construction materials include concrete, decorative stone and metal. The exterior of the restroom building and ramada structures will be faced with decorative stone, such as schist, to blend with the colors and textures of the surrounding hills. The structures have been designed to be functional, require low maintenance, and be vandal-resistant.

D. RESTROOM. One restroom is planned for the Dreamy Draw Dam basin. The building will be located above the 100-year flood elevation. Waste disposal will be accompanied by an organic waste disposal system. The restroom will contain four toilet compartments and two lavatories in the women's restroom; and two toilet compartments, two urinals, and two lavatories in the men's restroom. A service sink, electrical panel boards and plumbing fixtures will be accessible from a storage room in the restroom building. The restroom will be lighted and, for ease of maintenance, recessed electric hand dryers will be provided instead of paper towels. Vandal-resistant mirrors will be installed in lavatories. A drinking fountain and concrete trash receptacle will be adjacent to the restroom.

The restroom will be built of concrete with decorative stone or schist facing on the exterior. Ventilation will be provided. Construction materials will be selected on the basis of their lifespan, ease of maintenance, and resistance to vandalism (pl. 17).

E. PICNICKING AREAS. Two types of picnic areas will be provided: (a) group picnicking, and (b) individual picnicking. Facilities will be designed in accordance with ER 1110-2-400 (pls. 18 and 19).

1. Group Picnicking. The group-picnicking area will consist of the following: ramadas with tables and benches, barbeques, trash receptacles; assembly area; fire rings; horse tie-up facilities; and a horse-watering trough.

Five group picnic ramadas are planned. Each site will have four 20-foot (6.1 m) long concrete picnic tables with detached benches of similar construction and two group barbeques with steel braziers and built-in concrete trash receptacles. Barbeques will be concrete with rock facing. The tables and benches will have cast-in-place concrete supports with precast concrete table tops.

The ramada roof structures will be of precast concrete panels on precast concrete beams supported by rock-faced concrete columns. Sites will be lighted.

A concrete assembly area approximately 40 feet (12.2 m) by 70 feet (21.3 m) will be equipped with hookups for a public address system. Two 5 foot (1.5 m) diameter metal fire rings will be provided on each side of the assembly area.

Three horse-hitching facilities will be provided. Each tie-up area will be approximately 60 feet (18.1 m) long and 4 feet (.2 m) high. The hitching bar will consist of a 3-inch (76.2 mm) diameter galvanized hollow pipe supported with pipes set in concrete about every 10 feet (3 m). The horse-hitching bars will be approximately 35 feet (10.5 m) apart.

A concrete horse-watering trough will be provided. The trough will be about 5 feet (1.5 m) in diameter, 3 feet (.9 m) high, and will have a capacity of 200 gal (757 l). The trough will fill automatically.

2. Individual Picnicking. Three smaller ramadas of similar construction to that of the group ramadas will be provided adjacent to the group area. Each unit will have two 10-foot (3 m) tables with benches, one built-in barbeque, and it will be lighted.

F. TELEPHONE. No telephone facilities will be provided in the basin. But there is a public coin-operated telephone less than 1 mile east of the basin.

G. SOLID WASTE DISPOSAL. Twelve concrete trash receptacles will be placed outside the restroom and near the picnic ramadas. Two dumpsters

also will be placed on the site. The receptacles and dumpsters will be serviced by the City of Phoenix.

H. ACCESS ROADS AND CIRCULATION. An access road, emergency exit route, and a circulation system will be provided in the Dreamy Draw Dam area for motor vehicles, equestrian users, hikers, and joggers. General guidelines for each of these features are noted below.

1. Access Road and Trails. Entrance to the informal parking area will be via an access road which is to be paved from Dreamy Draw Drive west of 19th Street to the Dreamy Draw Dam spillway. The road will have a natural base where it crosses the spillway and enters the basin. Hikers, joggers, and equestrians will be able to enter the basin through underpasses, several existing and one proposed, that follow trails in the Phoenix Mountains Preserve and cross the high-speed roads. The road will follow the basic alinement of the existing graded dirt road constructed by the City of Phoenix (pl. 3). The length of paved road will be approximately 3200 feet (960 m) and will be 24 feet (7.3 m) wide with 3-foot (.9 m) rock shoulders. Maximum slopes of roadway will be 5 percent (pl. 22). Geometric design will be in accordance with TM 5-887-1, and pavement design will comply with TM 5-822-5. An 85-inch (2159 mm) by 54-inch (1372 mm) corrugated metal pipe arch culvert will be provided under the road at the streambed crossing to accommodate flows from the Dreamy Draw Dam outlet conduit (pls. 3 and 16). A turn-around area for vehicles will be provided at the upstream portion of the spillway. Speed limits along the access road will be 25 mph (40 km/h), conforming to park access roads in the City of Phoenix.

2. Emergency Exit Road. An unpaved emergency exit road will be constructed from the downstream portion of the spillway onto the Paradise Valley Access Relief Road. The exit road will not go below the standard project flood elevation. Length of the emergency exit road is approximately 1280 ft (3840 m) with a maximum slope of 7 percent. Width of the road will be 12 ft (3.6 m) with no shoulders. Strategically placed signs will caution visitors of proper use of the road.

3. Circulation in the Basin. A circulation system in the basin will be provided for pedestrians, equestrians, and vehicles. These groups may enter the informal parking area via the access road. Pedestrians and vehicles may cross the spillway and a 12-foot (3.6 m) wide bridge spanning about 40-feet (12 m) over an ordinarily dry wash. The bridge will be of concrete double-T construction with 3-foot (.9 m) high steel guardrails and including abutments and footings. The bridge will be designed for a live load of 100 lb/ft^2 (pl. 20). The Standard Specifications for Highway Bridges, 1977 AASHTO shall also be considered for general structural information. Equestrian access to the basin will be by an existing trail at the north end of the spillway.

Hiking, jogging, and equestrian trails will follow the alinement of existing trails and roads in the basin. Trail surfaces will remain the natural material. Slopes vary from 1 to 30 percent. Trails will be marked to indicate use.

Unnecessary roads in the basin will not be obliterated. The City of Phoenix has indicated that the costs are excessive and also it is believed that when access to the roads is blocked, the roads will revegetate on their own.

Access to the trails also may be gained from the south side of the Phoenix Mountains Preserve via several existing equestrian tunnels underneath Paradise Valley Access Relief Road. The equestrian tunnel to be constructed under Northern Avenue will be similar to those under Paradise Valley Access Relief Road and will comply with standards established by the Maricopa County Hiking and Riding Trails Committee. The underpass will be constructed of corrugated steel plates to form an elliptical tunnel with approximate dimensions of 12 feet (4 m) by 17.5 feet (5.5 m). The bottom of the underpass will be filled with loose dirt or sand 1 foot deep to prevent horses from slipping. The underpass will be connected to a trail; as shown on plate 14. The trail will be made by the horses using the trail; therefore, no additional cost or work will be necessary.

I. PARKING. Informal parking will be permitted just west of the horse tie-up area (pl. 3) and convenient to the basin recreation facilities. This parking area will be cleared of vegetation. No other modifications will be required, however, as the area is relatively flat and the surface material adequate for vehicles.

Overflow parking will be provided adjacent to the south side of the dam. Little work will be necessary because the area is relatively flat and devoid of vegetation. This area will have a gravel surface, and can accommodate up to 120 vehicles (pl. 3).

J. SITE IMPROVEMENTS. Site improvements include recontouring and landscaping. A depressed area in the vicinity of the horse watering trough will be filled in to prevent ponding of the area. Fill will be placed along the east side of the group picnic complex from an elevated area on the southeast to the side of the hill northeast of the ramada complex. The berm will help screen visibility and noise of vehicles traveling along Paradise Valley Access Relief Road from ramada users. The berm will be landscaped with desert vegetation such as that used by the City of Phoenix in relandscaping the Paradise Valley Access Relief Road. The plants used by the City of Phoenix and recommended for the berm are listed in Chapter 8. Irrigation will be provided.

K. SIGNS. Signs will be used in the Dreamy Draw Dam area to direct, guide, and caution visitors. Basic types of signs will include identification, information and guidance, direction, regulation, instruction, and location. A handicap logo sign or symbol will be integrated, where applicable.

An identification sign will be placed at the entrance to the recreation area. Information and guidance signs in the basin will conform to the National Park Service's uniform sign system. Directional signs will be placed along major arteries near the basin to provide visitors with proper access information. Regulatory signs will restrict motor access in the basin. Instruction signs will encourage proper use and respect of project and natural features. Instruction signs also will caution visitors about the potential flood hazard and how to exit the basin in a flood. Locational signs at strategic points will designate use areas.

All signs will be constructed of vandal-resistant material and will be placed for high visibility. The signs will be compatible with the esthetic character of the park.

L. WATER SYSTEM. A City of Phoenix 48-inch (1 219 mm) main water line transects the main embankment of the dam and continues through the upstream basin within the project right-of-way. Line pressure is approximately 90 lb/in^2 and delivery exceeds 28,000 gal/min (106 400 l/m). The water supply needed for the restroom, water trough, and irrigation system will tie into an existing valved outlet on this domestic line. A two-inch service is adequate for the water needs. There will be no provision for fire fighting (pl. 21).

The 48-inch (1 219 mm) main water line is covered by an average of 6 feet (1.8 m) of fill. The finished elevation at the dam top is 1418 feet (432 m) and the invert of flow line elevation at the same locale is 1409 feet (429 m). At points 700 feet (213 m) and 900 feet (274 m) upstream along the water line (generally northeast), the lowest elevation for the line in the basin is reached. The elevation at these points is 1394.20 feet (424.96 m) with an invert elevation of 1385.38 feet (422.27 m).

The proposed water line crosses through the center of the basin. At the point of the proposed waterline connection to the 48-inch (1 219 mm) main water line, the elevation of the finished grade is 1413 feet (431 m) with an invert elevation of 1401.55 feet (427.20 m). The pipe at this point is 7.45 feet (2.27 m) deep. The connection point to the existing water line is approximately 480 feet (146 m) from the proposed horse trough. The distance from the trough to the proposed location of the restroom is about 340 feet (104 m). The distance from the irrigation line, which will run behind (south of) the eastern berm, is approximately 520 feet (158 m).

Water conservation has been considered and will be considered in more detail during preparation of plans and specifications. To conserve water at the site, the restroom will not require water to operate the toilets. An organic waste treatment system will be used. Because the proposed restroom will dispose of gray water to underground tanks, this water could be recycled to proper water quality standards for irrigation.

Design guidelines for water system fixtures and accessories follow.

M. WATER SYSTEM FIXTURES AND ACCESSORIES. Because of the high amount exposure and minimum supervisory control, the Dreamy Draw Dam recreation area will require that all plumbing fixtures and accessories be vandalproof. The plumbing fixtures and accessories will be manufactured of either aluminum alloy, cast iron, or heavy gauge stainless steel base material; they will use casting, forming, welding, polishing, or combined fabricating processes thereof. All exposed fasteners will be vandalproofed. A wall-mounted combination drinking fountain and jug filler of precast reinforced concrete will be in front of the restroom. For ease of maintenance of the area, a loose-key hose bibb will be provided in a valve box at the base of the drinking fountain. Accessibility or the facilities for handicapped persons is also a necessary design requirement. The restrooms will have six toilet compartments (two in the men's and four in the women's room), two urinals, four lavatories (two each in the men's and women's room), and one service sink in the equipment room. The men's and women's rooms will be equipped with a hose bibb and floor drains to facilitate restroom maintenance.

1. Drinking Fountain. The drinking fountain and jug filler will be made of precast reinforced concrete with the facing the same as the restroom's. An access cover to the base housing the supply shutoff valve will be provided with a vandalproof fastening device. A loose-key hose bibb will be under a valve box at the base of the drinking fountain. The drinking fountain will have two lever-handle valves for left- or right-hand operation. The vandalproof bubbler, jug filler, and faucets also will be accessible to handicapped persons.

2. Toilet Compartments. The toilet compartment will be manufactured of heavy-gauge stainless steel. The women's restroom will have four separate compartments (one large enough for a wheelchair) without doors. Each compartment will be equipped with a Forest Service-type stainless steel toilet stool with a chute extension. The men's restroom will have two compartments (one large enough for a wheelchair), similarly equipped, with the other space equipped with two stainless steel urinals. Each compartment will also have a vandalproof paper holder. The toilet compartments will meet the minimum handicapped requirements presented in EM 1110-1-103, 15 October 76.

3. Lavatory. The four lavatories (two in men's, two in women's) will be manufactured of heavy-gauge stainless steel, attached to the wall with factory-supplied mounting clips and, through the wall, corrosion-resistant bolts using field-fabricated steel backup plates. The lavatory is similar to Supersecure Model SS-755 (No. 4 finished type 304 stainless steel). Faucets and spouts will be center-mounted and self-closing.

Faucets will be either four-arm self-closing single-basin faucets, such as T & S Brass and Bronze Works Inc. Model B-711, or slow self-closing push button faucets, such as T & S Brass and Bronze Works, Inc.

Model B-712. Water supply lines to the faucets will be provided with a stop valve.

4. Mirror. The polished (No. 8 mirror finish) stainless steel mirror will be frame-mounted with vandalproof fasteners. A mirror will be mounted approximately 40 inches (1 016 mm) above each lavatory. The mirrors are similar to Supersecure Model SM-1218 stainless steel mirrors.

5. Service Sink. The service sink in the storage room will be manufactured from cast iron with a white enamel finish. The sink will be mounted on a standard trap. Installation will be similar to the American Standard Model Akron Catalog No. 7696.016 (service sink), 8379.026 (rim guard), and 7798.176 (trap standard). The faucet will be a heavy-duty vacuum breaker-type with a top brace support for a pail-hook nozzle. The nozzle also will be threaded for hose connections. The faucet installation will be similar to T & S Brass and Bronze Works, Inc. Model B-667.

N. SEWAGE COLLECTION AND DISPOSAL SYSTEM. There are no sewer lines near the Dreamy Draw Dam basin. As discussed in Chapter 10, special site-specific factors make this area unsuitable for a standard septic system. Thus an alternative sewage collection and waste disposal system is recommended at the Dreamy Draw Dam site. An effective way of treating organic wastes and conserving water is the composting toilet. Using the natural process of aerobic decay, the composting toilet biologically decomposes organic matter and produces a nutrient-rich humus that can be used as fertilizer.

1. Composting Toilet Process Description. The process of aerobic decomposition is best illustrated by the natural process that takes place on a forest floor. This decaying process combines plant and animal remains with bacteria and oxygen. Nitrogen rich humus and odorless gases are the by-products of decomposition. The humus becomes a rich topsoil suitable for direct support of plant life and, indirectly, of animal life.

The composting toilet combines the natural process of aerobic decomposition with modern technology. In a large composting chamber, human waste and cellulose material are aerobically digested by microorganisms. Heat generated by this decomposition creates a natural draft in an insulated vent pipe and draws air through longitudinal air ducts in the mass. This provides odorless operation, helps evaporate liquids, and maintains effective aerobic conditions. Resulting odors, if detected, are less offensive than those typical of anaerobic pit or vault privies. As the material composts, it slowly slides down the inclined tank floor to an access area where it accumulates for periodic removal. This process takes 3 to 5 years, and, when complete, yields a small quantity of inoffensive soil-like material, much like moist decomposed forest litter or peat moss. Depending on conditions, varying amounts of liquid (with a soil-like odor) also will accumulate.

The advantages of the composting toilet include:

- No water is required for operation.
- Objectionable odors are eliminated by aerobic decomposition and a venting system.
- No pollution results from this type of installation because an impervious tank isolates wastes from the environment, while providing storage for the accumulation of the final product. Water vapor and carbon dioxide are the only major vented gases.
- The system can accommodate organic garbage, as well as human waste.
- The large capacity allows the system to function well, even with variations in loading resulting from seasonal use.
- Low maintenance is assured. Because treated material is greatly reduced, it is not unpleasant to handle and can be safely incorporated into nearby soils.

The disadvantage of the composting toilet is the following. Improper use could create a negative impact by creating a humus product that could be harmful to public health. Periodic maintenance of the restroom will help alleviate improper practices.

2. Installation Considerations. In selecting a site for a composting toilet, planners shall consider the following factors:

- Composting tanks must be installed at a 30-degree angle and above potential 100-year flood elevations and groundwater elevations.
- The tanks should have a southern exposure to maximize solar heating, and free air movement to enhance the draft and venting system.
- The tanks must be in an enclosure to prevent vandalism. A black steel plate solar roof would maximize solar heating while inhibiting access.
- A large door that can be locked will provide authorized access.
- A liquid storage tank below the level of each of the composting tanks will allow for storage of excess liquid wastes. These tanks also will be accessible to allow for pumping out, as needed.
- An automatic damper will be provided in the vent pipe in case vandals set a fire in the composting tanks.

- The restroom design must allow sufficient space underneath for installation of composting tanks. The restrooms will have an impervious concrete floor, vandalproof and fireproof walls and roof.

The composting tanks will be similar to the Clivus Multrum Organic Waste Treatment System.

3. Gray Water Collection. Water originating in the lavatories cannot be accommodated by the organic waste disposal system described above, because excess liquids will overtax the system. Therefore, gray water collection will be provided by underground seepage tanks. These tanks will not be within 25 feet (7.6 m) of major drainageways but will conform to the Arizona Department of Health Services requirements. As stated earlier, this water could be brought to compliance with the appropriate standards and recycled for irrigation.

O. ELECTRICAL DISTRIBUTION AND SECURITY LIGHTING. The electrical plan is described in the following subsections.

1. Power Service. In compliance with the City of Phoenix policy, electrical lines entering the Dreamy Draw Dam recreation area will be placed underground. At the junction of 19th Street and Northern Avenue, the Arizona Public Service Company will establish an electrical service point with a single-phase (7.2-kV) primary power overhead line. Primary underground service will run along the Paradise Valley Access Relief Road from the service point to the Dreamy Dram Dam restroom (pl. 21). A service meter, service equipment, grounded (120/240-V) panelboard, and a service transformer (in the restroom), will transform the single-phase (7.2-kV) primary to a grounded (120/240-V) secondary. The panelboard will supply power (120-V) for restroom lighting, receptacles and vent fan, and power (240-V) for ramada and parking area lighting. A conversion to a center tap grounded power supply (480/240-V) is necessary for the parking area lights.

2. Wiring. In cases where primary or secondary service entrances and exterior underground feeders and branches cross under paved areas, traffic areas, streams, or below the 100-year flood elevation, they must be encased in a duct line consisting of type I or type II conduit and entirely enclosed in concrete.

Exterior underground feeders and branches will be encased in type II conduit and must accompany the equipment grounding conductor. Under the concrete slabs laid for floors and within a 5 foot (1.5 m) perimeter of these slabs, feeders and branches will be laid in corrosion-protected steel conduit.

Openings in conduit terminals below the 100-year flood elevation of 1396.8 feet (419 m) will be sealed and plugged. Circuit terminals below this elevation will be insulated and waterproofed.

3. Lighting. Site lighting is essential to help assure security in the project area. It is the policy of the City of Phoenix Parks Department to provide minimal lighting levels in all recreation areas. Additionally, lighting is beneficial for the project in that it extends evening use of the facilities and improves safety.

The interior lighting fixtures for the restroom will be a vandalproof fluorescent-type with manual time switches set to a maximum duration of 5 min. Lighting levels will be approximately 20 foot candles (21.5 lm/m^2). Weatherproof and vandalproof exterior lighting fixtures at the entrances to the restrooms will be high-pressure sodium, operated by a type "A" photocell control.

Weatherproof and vandalproof high-pressure sodium-type lighting also will be provided at each of the ramadas. A type "A" photocell control will operate the exterior lighting. A type "B" photocell and time clock control will operate the interior ramada lighting.

Vandalproof poles and foundations designed to resist an isotach rating of 85 mph (137 km/h) or more will be provided for the parking area lighting. Three high-pressure sodium lamps (operated with 480 V) will illuminate the overflow parking area as night safety lights.

4. Lighting Control. One important criterion of the lighting control is that it should have an automatic turnoff to save energy. Type "A" controls--equipped with photocell and lighting contactors--will be provided for all-night lighting. Type "B" controls--equipped with photocells, time clock, and lighting contactors--will be provided for partial-night lighting. The branches with type "A" controls will be separated from branches with type "B" controls. Vandalproof, manually wound time switches will be provided to the branches of the restroom lights.

5. Public Address System. A branch conduit, empty conduit and outlet boxes for the proposed public address system will be provided at the assembly area. The public address system will be installed by the City of Phoenix.

P. VISITOR SAFETY CONTROLS AND CONVENIENCE FEATURES. Significant plans and features regarding visitor safety and convenience are noted below.

a. Public access along the top of the main embankment will be prohibited for safety and maintenance reasons. Signs proscribing unauthorized entry will be posted and an existing tempered cable across the dam service road will prevent unauthorized vehicular traffic.

b. Signs strategically placed at the picnic and parking areas will caution visitors about the potential flood hazard and instruct them for safely exiting the basin and parking area along paths and the emergency exit road.

c. A tunnel underneath Northern Avenue will enhance the safety of pedestrians and equestrians desiring to cross the high-speed road.

d. Speed-control signs will be posted along the access road to the basin. The maximum allowable speed limit will be 25 mph (40 km/h) in accordance with those allowed in other City of Phoenix recreation areas.

e. Facilities for the handicapped will be provided in the restrooms, at the group picnicking area, and along the trails.

Special Problems

Chapter 10

SPECIAL PROBLEMS

Certain aspects of construction and management of the resources in Dreamy Draw Dam basin warrant particular attention.

A. RESTROOMS. Locating the restrooms presented special problems because of several site-specific factors, as noted below:

- The restrooms needed to be easily accessible to persons using the group-ramada complex.
- The land use plan requires the restrooms be located above the 100-year flood elevation.
- The site is too far from Phoenix sewer lines for a connection to be cost efficient.
- Bedrock conditions and shallow soils characteristic of the site limit appropriate locations for a standard septic and leach field waste disposal system.

Maricopa County Health Department has visited the site. It has indicated that percolation tests to demonstrate the appropriateness of leaching in this area would be ineffective because the leached water could seep along the bedrock and emerge downslope. This condition would cause wet spots and discoloration with use.

Because of these limiting factors, an alternative waste disposal system is recommended. After several options were investigated, a solution was found to meet the requirements of the land use plan and to be acceptable to Phoenix, Maricopa County Health Department and the Arizona Department of Health Services. An organic waste disposal treatment system is recommended for the Dreamy Draw Dam site. This system is thoroughly discussed in Chapter 9. Because of the unique problems encountered in selecting a sewage disposal systems, the Corps' South Pacific Division agreed no cost comparison with a vault type or other type facility was necessary.

B. EQUESTRIAN UNDERPASS. Northern Avenue is a high-speed, one-way, two-lane road that daily carries approximately 23,600 vehicles from the northeast Phoenix and Paradise Valley areas southwest toward downtown Phoenix. Construction of the equestrian underpass beneath Northern Avenue will interrupt the traffic flow for approximately 45 days. A number of alternatives were analyzed for detouring around Northern Avenue during construction. They included temporary detour roads north and/or south of the existing road, closing one of the two lanes of northeast bound traffic on the Paradise Valley Access Relief Road and detouring traffic from southwest-bound Northern Avenue to that lane, closing Northern Avenue to all traffic for the duration of construction, closing one lane of traffic on Northern Avenue at a time to construct

the underpass, tunneling under Northern Avenue to install the underpass, bridging the construction segment, etc. But, because of the angle of the underpass beneath Northern Avenue, the volume of traffic using Northern Avenue and the Paradise Valley Access Relief Road, and the concern for preserving the integrity of the Phoenix Mountains Preserve, none of the above mentioned alternatives was deemed feasible or desirable by representatives of the City of Phoenix and Corps of Engineers.

Therefore, staff of both the City of Phoenix and the Corps of Engineers formulated another alternative that involves closing one lane (first lane) of Northern Avenue while the underpass is built beneath and extended from the closed portion of the road; the traffic is then diverted from the second lane to the extended or widened first lane while construction of the underpass continues beneath the second lane. Thus one lane of traffic on Northern Avenue is open at all times, traffic on the Paradise Valley Access Relief Road is not interrupted, the Phoenix Mountains Preserve is not scarred with a detour road, and the skew of the underpass can be accommodated without extensive shoring of the banks of the road. Both parties agreed to this compromise.

C. SAFETY. Dreamy Draw Dam has a relatively small drainage area, approximately 1.3 mi^2 (336.7 ha), and, consequently, the basin will fill rapidly in the event of standard project flood (as noted in Chapter 2). It is assumed that during a rainstorm that would produce such a flood, it would be raining in the Dreamy Draw Dam basin and, likely, within the Phoenix Mountains Preserve. Picnic areas and access between these areas will be above the 100-year flood elevation. Signs will be posted at the parking areas and picnic sites to instruct users what to do in case of a heavy rainstorm. During a heavy rainstorm, it is possible that a few users will choose to remain in the basin. But in a major flood, the City of Phoenix will be responsible for enforcing evacuation of the basin and thereby insuring the safety of the users.

D. OFF-ROAD VEHICLE USE. The presence of unauthorized motor vehicles in the basin and on the emergency exit and service roads will result in conflicts of use, environment degradation, and management problems. To minimize the potential use of these areas by unauthorized motor vehicles, removable bollards will be placed at the mouth of the spillway (upstream approach channel) and at the entrances to the emergency exit and service road. These bollards, or upright metal posts, will be placed inside a buried metal sleeve and locked into the sleeve. The City of Phoenix will be responsible for distributing the key to remove the bollards.

Bollards will be positioned to allow pedestrians and horses to pass between them, but four-wheeled vehicles will not be able to pass without removing the locked bollards. Although their passage will be hindered, some two-wheeled vehicles still will be able to get through the bollards.

Along the perimeter of the Dreamy Draw Dam site, defined by the alinements of Northern Avenue and the Paradise Valley Access Relief Road, access will be inhibited at easily accessible open areas by standard highway guardrails to prevent unauthorized vehicles from entering the basin in this way.

Only the Dreamy Draw Dam Drive entrance will be authorized for access of all vehicles. Proper management and enforcement of use areas by the City of Phoenix will help minimize these problems.

Resource Management

Chapter 11

PROJECT RESOURCES MANAGEMENT

A. GENERAL. The City of Phoenix, as resource manager for the Dreamy Draw Dam Recreation Area, in conjunction with the Army Corps of Engineers, will prepare a resource management plan for the area. Specific details are not included here because the management, maintenance, and control aspects of the area have not been clearly delineated. When completed, a more detailed Resource Operation and Maintenance Plan will be included as an appendix to this master plan.

B. OPERATIONAL CONCEPTS AND POLICIES. The recreation cost-sharing agreement stipulates that the local entity (City of Phoenix) will be responsible for the operation of the recreation sites in the Dreamy Draw Dam area. The City of Phoenix will establish policies allowing for the continued and unhampered fixed purpose of the area for flood control.

Uses compatible with the character of the Phoenix Mountain Preserves will be established and encouraged, with protection and enhancement of the environmental quality a prime objective of the local sponsoring agency. In meeting the needs of the people of Phoenix, this area has been designed for several day-use activities, which will include picnicking, hiking, jogging, horseback riding, and staged events.

C. STAFFING AND ORGANIZATION. The management of the Dreamy Draw Dam Recreation Area will be the responsibility of the Phoenix Department of Parks and Recreation. This will include scheduling of equestrian and jogging events, and reservations for the group ramada site. If a need develops for an onsite park ranger, one will be supplied by the local agency.

D. ADMINISTRATION AND MAINTENANCE. Administrative duties and maintenance responsibilities for the recreation facilities will rest on the local agency, the Department of Parks and Recreation for the City of Phoenix.

E. LAW ENFORCEMENT. Law enforcement in the project area will be the responsibility of the enforcement agency of the City of Phoenix. The project area will be patrolled regularly by local police and possibly a park ranger.

F. SAFETY. Signs, markers, and physical barriers will be provided throughout the entire project area. They will control pedestrian, equestrain, and vehicular traffic, and will warn the public of potentially hazardous conditions if a flood should occur. The local agency will be responsible for insuring the safe and proper use of the Dreamy Draw Dam area, including the project lands, recreation facilities, and other features.

G. CONCESSIONAIRE ACTIVITIES. No concessionaire activities are proposed now.

H. FIRE PROTECTION. Fire protection for the Dreamy Draw Dam Recreation Area will be the responsibility of the City of Phoenix.

Cost Estimates

Chapter 12

COST ESTIMATES

A. GENERAL. The cost estimates presented in this master plan were developed using September 1981 price levels. These estimated first costs include recreation facilities, relocation of utilities, access roads, trail undercrossings, engineering and design, and supervision and administration.

The total recreation cost will be shared equally by Federal and non-Federal interests, the City of Phoenix (appendix 2). Non-Federal interests must provide all lands required for the project. Where the cost of lands amounts to less than 50 percent of the total first cost of the recreation development, the non-Federal interests are required to make additional contributions sufficient to bring the local share to at least 50 percent of the total cost of recreation development.

B. LANDS. Lands required for flood control are owned by the City of Phoenix, subject to flood control easements held by the Flood Control District of Maricopa County. These lands were required for the construction of flood control structures, such as channels and dikes.

In accordance with a Maricopa County resolution adopted 3 June 1974--authorizing Federal, State, county, municipal, or private agencies to develop recreation facilities on flood control district lands--recreation development is proposed as part of the project. Lands that are required for recreation, excluding flood control lands, will be purchased by the non-Federal sponsor of the recreation development and will be credited toward the non-Federal share of the recreation costs. All lands will be acquired in accordance with a requirement of the Corps of Engineers. No additional lands are needed for recreation development at Dreamy Draw Dam.

C. OPERATION AND MAINTENANCE. Under the provisions set forth in the authorizing legislation, all costs incurred for operation and maintenance of flood control features and the recreation facilities will be the responsibility of the local interests. The Maricopa County Flood Control District is the flood control sponsor, and the City of Phoenix is the recreation development sponsor. The operation and maintenance costs will be approximately $7600 per year (appendix 2). This figure was based on a budget estimate and similar situations for the City of Phoenix.

Table 5 shows cost estimates for recreation development.

Table 6 shows cost estimates for the equestrian underpass.

Table 7 shows cost estimates for electrical services and estimate totals.

Table 8 shows cost summary.

Table 5. Cost Estimates for Recreation Development.

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
1.	Picnic ramadas, 38 ft x 31 ft 4 in. 1,191 ft^2	5	EA	22,630.00	113,150
2.	Picnic ramadas, 19 ft x 16 ft, 304 ft^2	3	EA	7,700.00	23,100
3.	Picnic tables, precast concrete, 20 ft x 3 ft x 4 in. thick w/benches	20	EA	1,500.00	30,000
4.	Picnic tables, as above, 10 ft x 3 ft x 4. in thick	6	EA	750.00	4,500
5.	Restroom, 24 ft x 34 ft 8 in., 832 ft^2, Clivus Multrum Waste Disposal ($26,760 includes 6 tanks and toilets, and 2 urinals)	1 job	LS	103,400.00	103,400
6.	Assembly area, 40 ft x 70 ft; concrete	1	EA	9,000.00	9,000
7.	Fire rings, 5 ft Ø Metal	2	EA	970.00	1,940
8.	Barbecues, 15 ft x 3 ft x 1 ft 6 in., concrete w/schist facing	10	EA	4,500.00	45,000
9.	Barbecues, as above, 10 ft x 3 ft x 1 ft 6 in.	3	EA	3,000.00	9,000
10.	Horse tie-ups, 60 ft long x 4 ft high	3	EA	1,480.00	4,440
11.	Horse watering trough 5 ft dia. x 3 ft high, automatic filler (installed)	1	LS	1,200.00	1,200
12.	Bridge, steel welded construction 40 ft x 12 ft, 480 ft^2 @ $62. ft^2	1	EA	29,760.00	29,760
13.	Concrete trash receptacles	12	EA	350.00	4,200
14.	Access road, 2 in. A.C., ABC, comp. subgrade, 24 ft wide, 3200 ft long	1	LS	75,000.00	75,000
15.	Safety signs	4	EA	129.00	520
16.	Directional signs	11	EA	129.00	1,420
17.	Light pole, 40 ft	5	EA	2,730.00	13,650
18.	Entrance gate, Type "B", 30-ft swing gate w/chain	1	EA	1,850.00	1,850

Note: Abbreviations are identified at the end of the table.

Table 5. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
19.	Jogging trail, graded, 4 ft wide 2.2 mi (46,464 ft^2)	5,163	yd^2	1.10	5,680
20.	Emergency exit road, graded, 12 ft wide, 1280 lin ft	1,707	yd^2	1.00	1,710
21.	Relandscaping native plants 5 to 10% cover	35,000	ft^2	.13	4,550
22.	Bollards, @ pedestrian bridge	7	EA	150.00	1,050
23.	Standard guardrail	2,500	LF	15.50	38,750
24.	Berm construction and recontouring fill, ramada area	10,000	yd^3	3.00	30,000
25.	Earthwork, emergency exit road	6,800	yd^3	4.20	28,560
26.	2-in. dia. galv. pipe (water supply line), installed	1,600	LF	10.00	16,000
27.	Refuse dumpster, 2 yd^3	2	EA	355.00	710
28.	Rock shoulder, access road	2,270	yd^2	1.15	2,610
29.	85-in. x 54-in. Culvert, 12-gage, installed	110	LF	75.00	8,250
30.	Gravel surface, parking area	300	yd^3	8.00	2,400
31.	Aggregate base course, service road	210	Ton	10.00	2,100
32.	Earthwork, access road	11,300	yd^3	4.20	47,460
	Subtotal, Recreation Development				660,960

Table 6. Cost Estimates for Equestrian Underpass.

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
1.	Clearing and grubbing	.45	Acres	4,840.00	2,180
2.	Signing, detour	1 job	LS	500.00	500
3.	Excavation				
	detour	250	yd^3	3.00	750
	underpass	122	yd^3	3.00	365
4.	Fill, compacted				
	detour	2,740	yd^3	11.00	30,140
	underpass	850	yd^3	11.00	9,350
5.	Aggregate base course	468	Ton	10.00	4,680
6.	Asphalt concrete	187	Ton	35.00	6,545
7.	13 ft, 2 in. span x 11 ft rise, multiplate underpass #8 gage	110	LF	380.00	41,800
8.	Trail fill-in underpass	40	yd^3	9.00	360
9.	Esthetic treatment (planting)	1 job	LS	4,800.00	4,800
	Subtotal, Equestrian Underpass				101,470

LS means lump sum. LF means linear foot.

Table 7. Cost Estimates for Electrical Services.

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
1.	Primary Service				
	Primary service cable, 5 kV 2 conductors	6,000	LF	5.70	34,200
	Excavation and backfill	6,000	LF	2.10	12,600
	Subtotal, Primary Service				46,800
	Restroom				
1.	Primary transformer, oil filled, 10kVA, 480V- 120/240V, 1Ø, 3W grounded, w/fused switch and lighting arrestors	1	EA	1,730.00	1,730
2.	Secondary:				
	Service meter socket and service disconnect 100A-120/240V - 1Ø - 3W	1	EA	410.00	410
	Service Ground	1	EA	680.00	680
3.	Lighting Control:				
	Manual time Switch, 0-5 min., 1P-20A, 120V	2	EA	98.00	195
	Time switch, 120V, astronomic dial	1	EA	275.00	275
	Lighting contactor, 120V, 4 pole	1	EA	275.00	275
4.	Duplex receptable, indoor type, 120V - 15A	1	EA	30.00	30

Note: Abbreviations are identified at the end of the table.

Table 7. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
5.	Hand dryer w/o heater, 120V	2	EA	165.00	330
6.	Switch, 1P - 20A, 120V	1	EA	35.00	35
	Switch, 2P - 30A, 480V	2	EA	275.00	550
7.	Lighting Fixture				
	Vandal-resistant, fluorescent fixture w/2 - F40 lamps - 120V	6	EA	300.00	1,800
	150W, 120V - Vandal-resistant HPS fixture	3	EA	410	1,230
8.	Panelboard, 120/240V 1Ø, 3W, 18P-100A 7500 AIC	1	EA	950	950
	Subtotal, Restroom				8,490
	Group Ramadas				
1.	Lighting control:				
	Photocell	1	EA	205.00	205
	Time switch, 240V, astronomic dial	1	EA	275.00	275
	Lighting contactor, 240V, 2 pole	2	EA	275.00	550
2.	Duplex receptacle locked cover, W.P., 120V - 15A w/GFI	5	EA	200.00	1,000
3.	Lighting fixtures, 150W, 240V vandal-resistant HPS fixture	10	EA	475.00	4,750

Table 7. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
4.	Transformer, 2kVA, 240V - 480/240V 1Ø 3W grounded	2	EA	285	570
	Subtotal, Group Ramada				7,350
	Individual Ramadas				
1.	Duplex receptacle with G.F.I.	3	EA	200.00	600
2.	Transformer, 5kVA, 480V 120/240V 3W 1Ø	2	EA	700.00	1,400
3.	Switch 600V, 2P-30A	3	EA	400.00	1,200
4.	Panelboard B, C, & D	3	EA	1,500.00	4,500
5.	Photocell	3	EA	200.00	600
6.	Time clocks and contactors	3	EA	400.00	1,200
7.	480V conduit and conductors concrete encasement	1,500	LF	7.00	10,500
8.	120/240V conduit and conductors in concrete encasement	150	LF	6.00	900
9.	H.P.S. type luminaire vandalproof type	6	EA	450.00	2,700

Table 7. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
10.	Wiring, ramadas grounding	1	LS	2,000.00	2,000
	Subtotal, Individual Ramadas				25,600
	Assembly Area				
1.	Lighting fixture: 150W, 240V, Vandal-resistant HPS fixture	5	EA	476.00	2,380
2.	Duplex receptacle, locked cover, W.P., 120V - 15A w/GFI	1	EA	200.00	200
3.	Speaker outlet box	3	EA	46.00	140
	Subtotal, Assembly Area				2,720
	Parking Area				
1.	Lighting standard 40'H w/400W, 480V, HPS luminaire and lamp	5	EA	2,730.00	13,650
	Subtotal, Parking Area				13,650

Table 7. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
	Conduit:				
	4 in. type 11 PVC	500	LF	10.90	5,450
	2 in. RGS	20	LF	5.50	110
	1 1/2 in. RGS	500	LF	3.45	1,725
	1 in. RGS	500	LF	2.75	1,375
	3/4 in. RGS	500	LF	2.05	1,025
	1/2 in. RGS	300	LF	1.40	420
	Conductor:				
	No. 12 AWG	4,000	LF	.42	1,680
	No. 10 AWG	2,500	LF	.56	1,400
	No. 8 AWG	4,000	LF	.69	2,760
	No. 2 AWG	50	LF	1.70	85
	Subtotal, Conduit and Conductor				16,030
	Subtotal, Electrical Services				120,640
	Subtotal Summary:				
	Table 5				660,960
	Table 6				101,470
	Table 7				120,640
	Subtotal				883,070
	Contingency				132,430
	Total (Construction Cost)				1,015,500

AD-A130 263 DREAMY DRAW DAM - MASTER PLAN AND FEATURE DESIGN NEW RIVER AND PHOENIX CITY STREAMS ARIZONA(U) ARMY ENGINEER DISTRICT LOS ANGELES CALIF SEP 81 2/2

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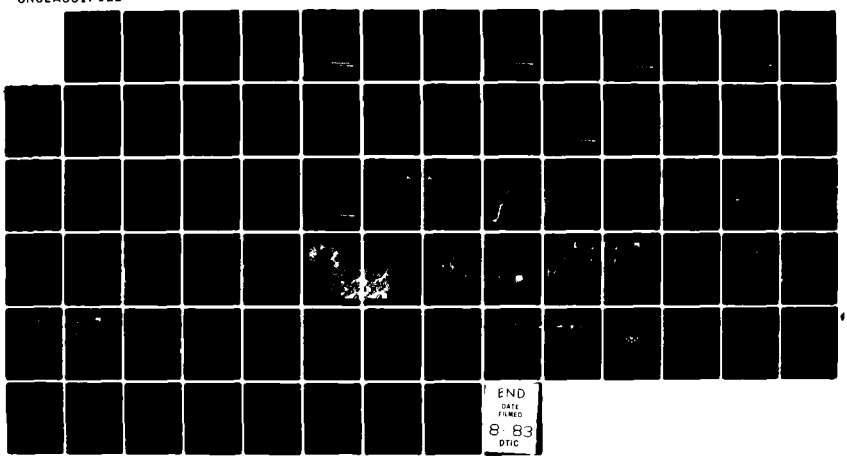


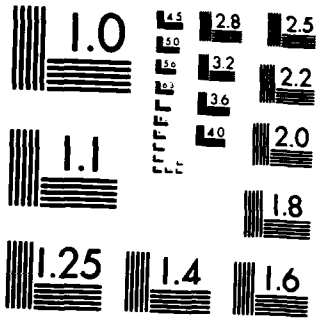


Table 7. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
	Engineering & Design				177,000*
	Supervision & Administration				80,000
	TOTAL				1,272,500
	Lands				0
	Total Recreation Cost				1,272,500

LF means linear foot. LS means lump sum.
*Includes $15,000 for preparation of Feature Design Memorandum

Table 8. Cost S

Facility	Initial Quantity	Initial Cost 100% Federal	Initial Cost 100% Local	Cost Shared	Future Quanti
Group Ramada	5 ea			204,730	
Individual Ramada	3 ea			36,600	
Restroom	.1 ea			103,400	
Bridge, Steel Welded Construction	1 ea			29,760	
Trash / Dumpster Receptacles	14 ea			4,910	
Road Construction	LS			157,440	
Signals / Signs	15 ea			1,940	
Road / Parking Appurtenances	LS			57,700	
Jogging Trail	2.2 mi			5,680	
Relandscaping Native Plants	35,000 sf			4,550	
Berm Construction and Recontouring Fill	10,000 cy			30,000	
2" Dia. Galv. Pipe	1,600 LF			16,000	
Drainage Culvert	1 ea			8,250	
Equestrian Underpass	1 ea			101,470	
Electrical Service	LS			120,640	
Total				883,070	

Note: LS means lump sum, LF means linear foot.

Cost Summary

Quantity	Future Cost 100% Federal	Future Cost 100% Local	Future Cost Cost Shared	Local Quantity	Total Cost 100% Federal	Total Cost 100% Local	Total Cost Cost Shared
							204,730
							36,600
							103,400
							29,760
							4,910
							157,440
							1,940
							57,700
							5,680
							4,550
							30,000
							16,000
							8,250
							101,470
							120,640
							883,070

Comparisons of Cost

Chapter 13

DEPARTURE FROM PREVIOUSLY APPROVED PLANS: COMPARISON OF COSTS

A. GENERAL. Table 9 shows a comparison of the estimated first costs for recreation development at Dreamy Draw Dam. These estimates include the Phase I, PB-3, and present (September 1981) estimates. The figures represent the total expected recreation development costs, including the non-Federal contributions. The purpose of this section is to account for modifications in the Phase I estimated costs, as compared with the PB-3 and present estimates.

B. COMPARISON OF PHASE I ESTIMATES WITH PB-3 ESTIMATES. The Phase I estimates, completed in October 1975 and presented in the New River and Phoenix City Streams General Design Memorandum - Plan Formulation (GDM), were a preliminary calculation designed to assess costs for the Federal and non-Federal entity cost sharing in recreation development. The Phase I figures reflect preparatory recreation planning efforts.

The PB-3 figures demonstrate the application of price leveling on the original Phase I cost estimates for the project. The PB-3 figures also include additional engineering and design costs for modification in plan.

C. COMPARISON OF PRESENT ESTIMATES WITH PB-3 ESTIMATES. Any changes in the present (September 1981) estimated first costs, as compared with the PB-3 estimates shown on Table 9 are due to the changes of the function and magnitude of the scope and modification from the Phase I GDM. These changes, along with price leveling, increased the cost of facilities for the proposed recreation development and increased local participation. Campsites and water hookups for them have been deleted. The following features have been added: assembly area, fire rings, jogging trail, barbecues, bridge, trash receptacles, safety signs, entrance gate, landscaping, bollards, guardrails and berm in ramada area.

Table 9. Comparison of First Costs.

Cost Acct. No.	Item	Recommended Plans Estimates in Thousands of Dollars (Rounded) Oct. 1975 Phase I	Oct. 1980 PB-3	Sept. 1981 Present
	Cost of Recreation*			
14	Dreamy Draw Dam	334,000	514,000	1,015,500
30	Engineering and design	33,000	162,000	177,000
31	Supervision and administration	33,000	80,000	80,000
	Total	400,000	756,000	1,272,500
	Lands	0	0	0
	Recreation First Cost (Cost Shared)	400,000	756,000	1,272,500
	Federal Contribution for:			
	Cost sharing	200,000	378,000	636,250
	Total contribution	200,000	378,000	636,250
	City of Phoenix's Contribution for:			
	Cost sharing	200,000	378,000	636,250
	Lands	0	0	0
	Total contribution	200,000	378,000	636,250

*Includes non-Federal contributions.

Conclusions

Chapter 14

CONCLUSIONS

This master plan discusses the comprehensive development recommended for the Dreamy Draw Dam basin. From the information presented herein, it is generally concluded that:

a. The plan optimizes the use of land for flood control, open space, and recreation development. The primary purpose of flood control will be maintained and the secondary purposes of recreation and open space will be provided.

b. Construction of the Dreamy Draw Dam development plan will enhance recreation opportunities in Maricopa County.

c. Recreation opportunities and improvements planned are in concert with the needs identified in the Statewide Comprehensive Outdoor Recreation Plan.

d. Development of the plan will help the demands for certain types of day-use activities. Although the plan will not fulfill the market area's total recreation demand, it will significantly increase opportunities for trail assemblies, picnicking, trail riding, hay rides, hiking and jogging, and assembly area activities.

e. Rapid urban growth in the Phoenix metropolitan area makes Dreamy Draw basin valuable for recreation and open space.

f. Hydrologic and hydraulic considerations have been used in planning activities and their locations in the basin, including access and egress routes, to insure user safety.

g. Development of Dreamy Draw Dam basin will complement the development planned for the Phoenix Mountains Preserve.

h. The north and south portions of the Phoenix Mountains Preserve will be linked to one another by the types of facilities and equestrian underpass planned for the Dreamy Draw Dam basin.

i. Trails planned for the basin will be integrated with local trail systems.

j. The development plan optimizes the use of available project lands with respect to costs and future demands.

k. The development plan has strong local support from officials, departments, and user groups.

l. The City of Phoenix will operate and maintain the facilities and manage the resources in continuity with their management policies of the Phoenix Mountains Preserve and other recreation areas.

Recommendations

Chapter 15

RECOMMENDATIONS

It is recommeded this master plan be approved for the following reasons:

- To enrich the recreation and social well-being of the general public
- To enhance the natural, scenic, and recreation resources of the project area
- To help satisfy the recreation needs of the market area
- To provide the basis for the preparation of plans and specifications for recreation development
- To serve as a general guide for future planning, design, development, and managament of the project lands

Appendix

Appendix A

Contract Between
The United States of America
and City of Phoenix
for
Recreation Development
At Dreamy Draw Dam, a Part of the
New River and Phoenix City Streams Flood Control Project,
Gila River Basin, Arizona

Appendix A.

CONTRACT BETWEEN
THE UNITED STATES OF AMERICA
AND
CITY OF PHOENIX
FOR
RECREATION DEVELOPMENT
AT DREAMY DRAW DAM, A PART OF THE
NEW RIVER AND PHOENIX CITY STREAMS FLOOD CONTROL PROJECT,
GILA RIVER BASIN, ARIZONA

THIS CONTRACT entered into this _____ day of _____, 19___ by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented by the Contracting Officer executing this contract, and the City of Phoenix (hereinafter called "City"),

WITNESSETH THAT:

WHEREAS, the Flood Control Act approved 27 October 1965 (Public Law 89-298, 89 Congress) authorized the Gila River Basin, New River and Phoenix City Streams Flood Control Project (hereinafter called the "Project"), which included the construction of flood control features and recreation facilities, if found to be economically justified; and

WHEREAS, said Project was subsequently modified by Design Memorandum No. 3 (General Design Memorandum - Phase I) approved by the Chief of Engineers, 8 July 1977; and

WHEREAS, it is the goal of the City of Phoenix to realize the fulfillment of the nationally recognized Sun Circle Trail and to develop recreation facilities along its route and on adjacent spur trails to it; and

WHEREAS, pursuant to Section 4 of the 1944 Flood Control Act, as amended by Section 207 of the 1962 Flood Control Act, as amended (16 U.S.C. 460d), the Government is authorized to make contracts with non-Federal public bodies for development, management, and administration of the recreation resources of Federal water resources projects; and

WHEREAS, the Office of the Chief of Engineers has established certain policy for recreation development at Federal non-reservoir water resources projects consistent with Congressional intent as expressed in the Federal Water Resource Project Recreation Act of 1965 (Public Law 89-72).

NOW, THEREFORE, the parties agree as follows:

ARTICLE 1 - DEFINITION OF TERMS. For the purpose of this contract certain terms are defined as follows:

(a) First Costs, used interchangeably with the terms "capital costs" and "project costs", are the initial capital costs of the recreation features of the project, including: engineering, design, supervision and administration, land acquisition, and construction.

(b) Recreation Lands: Project lands acquired primarily for recreation purposes, excluding lands needed for flood control or other project purposes.

(c) Recreation Facilities: Those facilities for recreation that may be installed pursuant to this agreement.

ARTICLE 2 - LANDS AND FACILITIES.

(a) The City is required to provide all recreation lands.

(b) The Government agrees to design and construct the Project to provide for optimum enhancement of general recreation consistent with other authorized Flood Control Project purposes. Details on lands and facilities necessary for such enhancement are shown in Gila River Basin, New River and Phoenix City Streams, Arizona; Design Memorandum No. 3, General Design Memorandum - Phase I, as concurred in by the City and incorporated herein by reference.

(c) The Government, in cooperation with the City, will prepare a mutally acceptable Recreation Master Plan that will depict and identify the types and quantities of facilities that the Government and the City will construct in accordance with this contract. The currently estimated cost of facilities to be provided is contained in Exhibit A, entitled "Estimated Recreation First Cost," attached hereto and made a part hereof. Such estimate of facility cost is subject to reasonable adjustment as appropriate upon completion of construction and approval of the above-mentioned Recreation Master Plan.

(d) The facilities as shown in Exhibit A, as it may be adjusted in accordance with paragraph (c) above, shall be constructed jointly by the parties through mutually satisfactory division of responsibility for construction that takes into account direct and indirect cost savings that may be gained by the parties in the public interest for certain specific facilities, provided that the facilities to be constructed by each party shall be formally agreed upon by the two parties prior to construction, consistent with the provisions of Article 3.

(e) Title to all lands and facilities specificaly acquired, developed, or constructed by or with Government assistance to enhance the recreation potential of the project shall at all times be in public ownership.

(f) The performance of any obligation or the expenditures of any funds by the Government under this contract is contingent upon Congress making the necessary appropriations and funds being allocated and made available for the work required hereunder.

ARTICLE 3 - CONSIDERATION AND PAYMENT. Each party hereto will pay or contribute in kind fifty percent (50%) of the first costs of recreation development and fifty percent (50%) of the costs of future development. Cost to local interests may exceed fifty percent (50%) if the cost of recreation lands exceeds the cost of recreation facilities.

(a) Initial Development. Fifty percent (50%) of the estimated first costs of initial recreation development is estimated to be $636,250. Prior to the advertisement of the first construction contract hereunder and again prior to the advertisement of each subsequent construction contract thereafter, the Government Contracting Officer shall calculate the estimated expenditures that each party shall have made through the end of such contract. If the total estimated expenditures by the Government shall exceed those of the City, the City shall pay to the Government such sum as will equalize the expenditures of both parties, prior to award of such contract. In computing expenditures, there shall be considered, in addition to cash expenditures, contributions in kind such as land or facilities, at the fair market value thereof at the time such land and facilities are provided, which value shall not include enhancement due to the project. Upon completion of initial recreation development, an adjustment will be made on the basis of actual costs incurred. It is understood and agreed that the City's share of the cost of the construction shall be computed on the basis of actual costs to the Government of the work included in the Government construction contract above and on the basis of unit prices in the Government contract and final quantities covering labor, materials, and equipment required for the work under the Government construction contract, plus the actual cost to cover Government's costs for engineering, design, supervision and administration, and not on the basis of prior estimates.

(b) Future Development. Neither party is obligated by this contract to undertake any future development of the Project, except to the extent this contract may be so modified by future supplemental agreement signed by the parties and approved by the Secretary of the Army or his authorized representative. If at any time the City wishes to undertake further development of the facilities hereunder, it may do so at its expense provided prior approval of the Contracting Officer is obtained, but the Government shall not be obligated to reimburse the City for any portion of such expense in the absence of a supplemental agreement hereto as aforesaid.

(c) Other Federal Funds. No repayment credit of any kind whatsoever will be allowed the City for expenditures financed by, involving, or consisting of, either in whole or in part, contributions or grants of assistance received from any Federal agency in providing any lands or facilities for recreation enhancement hereunder.

(d) Adjustments to Reflect Costs. The dollar amounts set forth in this Article are based on the Government's best estimates, and are subject to adjustments based on the costs actually incurred. Such estimates are not to be construed as representations of the total financial responsibilities of each of the parties.

ARTICLE 4 - CONSTRUCTION AND OPERATION OF ADDITIONAL FACILITIES. Certain types of facilities, including, but not necessarily limited to restaurants, lodges, golf courses, cabins, clubhouses, overnight or vacation-type structures, stables, marinas, swimming pools, commissaries, chairlifts, and such similar revenue-producing facilities, may be constructed by the City or third parties and may be operated as concessions by the City or by third parties. Any such construction and operation of these types of facilities shall be compatible with all project purposes and shall be subject to the prior approval of the Contracting Officer. However, the City shall not receive credit for costs for such facilities against amounts due and payable under Article 3.

ARTICLE 5 - FEES AND CHARGES. - The City may assess and collect fees for entrance to developed recreation areas and for use of the project facilities and areas, in accordance with a fee schedule mutually agreed to by the parties. In the event that the City should elect to go with a fee schedule, an initial mutually acceptable fee schedule will be set forth in an exhibit to the contract, prior to completion of the project. Not less often than every five (5) years, the parties will review such schedule and upon the request of either, renegotiate the schedule. The renegotiated fee schedule shall, upon written agreement thereto by the parties, supersede prior schedules without the necessity of modifying this contractual document.

ARTICLE 6 - FEDERAL AND STATE LAWS.

(a) In acting under its rights and obligations hereunder, the City agrees to comply with all applicable Federal and State laws and regulations, including but not limited to the provisions of the Davis-Bacon Act (40 U.S.C. 276 a-a 7); the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333); and part 3 of Title 29, Code of Federal Regulations.

(b) The City furnishes its assurance that it will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 241, 42 U.S.C. 2000d, et seq) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations. The City agrees also that it will obtain such assurances from all its concessionaires.

(c) The City furnishes its assurance that it will comply with Section 210 and 305 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).

ARTICLE 7 - OPERATION AND MAINTENANCE. The City shall be responsible for operation, maintenance, and replacement without cost to the Government, of all facilities developed to support Project recreation opportunities. The City shall maintain all Recreation Project lands, waters and facilities in a manner satisfactory to the Contracting Officer.

ARTICLE 8 - RELEASE OF CLAIMS.

(a) The Government and its officers and employees shall not be liable in any manner to the City for or on account of damage caused by the development, operation, and maintenance of the recreation facilities of the Project. The City hereby releases the Government and agrees to hold it free and harmless and to indemnify it from all damages, claims, or demands that may result from development, operation, and maintenance of the recreation areas and facilities.

(b) The City shall require its concessionaires to obtain from an insurance company, licensed in the State and acceptable to the Government, liability or indemnity insurance providing for minimum limits of $300,000 per person in any one claim, and an aggregate limit of $750,000 for any number of persons or claims arising from any one incident with respect to bodily injuries or death resulting therefrom, and $200,000 for damage to property suffered or alleged to have been suffered by any person or persons resulting from operations under any agreement between the City and its concessionaires.

ARTICLE 9 - TRANSFER FOR ASSIGNMENT. The City shall not transfer or assign this contract nor any rights acquired thereunder, nor grant any interest, privilege or license whatsoever in connection with this contract without prior approval of the Secretary of the Army or his authorized representative except as provided in Article 4 of this contract.

ARTICLE 10 - DEFAULT. In the event the City fails to meet any of its obligations under this agreement, the Government may terminate the whole or any part of this contract. The rights and remedies of the Government provided in this Article shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

ARTICLE 11 - EXAMINATION OF RECORDS. The Government and the City shall maintain books, records, documents, and other evidence pertaining to costs and expenses incurred under this contract, to the extent and in such detail as will properly reflect all net costs, direct and indirect, of labor, materials, equipment, supplies, and services, and other costs and expenses of whatever nature involved therein. The Government and the City shall make available at their offices at reasonable times, the accounting records for inspection and audit by an authorized representative of the parties to this contract while this contract is in effect.

ARTICLES 12 - RELATIONSHIP OF PARTIES. The parties to this contract act in an independent capacity in the performance of their respective functions under this contract and neither party is to be considered the officer, agent, or employee of the other.

ARTICLE 13 - INSPECTION. The Government shall at all times have the right to make inspections concerning the operation and maintenance of the lands and facilities to be provided hereunder.

ARTICLE 14 - OFFICIALS NOT TO BENEFIT. No member of nor delegate to the Congress, nor Resident Commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corportation for its general benefits.

ARTICLE 15 - COVENANT AGAINST CONTINGENT FEES. The City warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by the City for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to add to the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 16 - ENVIRONMENTAL QUALITY.

(a) In furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law 91-190, 42 U.S.C. 4321, 4331-4335) and Executive Order 11514, entitled "Protection and Enhancement of Environmental Quality," March 5, 1970 (35 Federal Register 4247, March 7, 1970), the Government and the City recognize the importance of preservation and enhancement of the quality of the environment and the elimination of environmental pollution. Actions by either party will be after considerations of all possible effects upon the Project environmental resources and will incorporate adequate and appropriate measures to insure that the quality of the environment will not be degraded or unfavorably altered.

(b) During construction and operation undertaken by either party, specific actions will be taken to control environmental pollution that could result from their activities and to comply with applicable Federal, State and local regulations concerning environmental pollution. Particular attention should be given to (1) reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases and smoke from temporary heaters; (2) reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion; (3) minimization of noise levels; (4) on and off site disposal of waste and spoil activities; and (5) prevention of landscape defacement and damage.

ARTICLE 17 - VALUE OF LANDS AND FACILITIES. If the parties hereto cannot agree on the fair market value of any lands or facilities and cannot otherwise resolve such differences, each party shall name an appraiser and the two appraisers so named shall name a third appraiser, and the decision of at least two of such three appraisers as to the fair market value shall be final and conclusive upon both parties.

ARTICLE 18 - EFFECTIVE DATE. This contract shall take effect upon approval by the Secretary of the Army or his authorized representative.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first written above.

THE UNITED STATES OF AMERICA

By _____
Colonel, Corps of Engineers
Col. CE, Commanding
Contracting Officer

DATE _____

THE CITY OF PHOENIX

By _____
City Manager, City of Phoenix

ATTEST:

_____

APPROVED:
City Clerk, City of Phoenix

_____

DATE _____

The undersigned, as chief legal officer for the City of Phoenix, approves the foregoing agreement as to form and legality this _____ day of _____ , 19____. I have reviewed the contract in the light of the requirements of Section 221 of Public Law 91-611. I further find that the City of Phoenix is a legally constituted body having full legal authority to enter into the foregoing agreement and to respond to damages in the event that it fails to fulfill its contractual obligations.

_____
City Attorney
City of Phoenix, Arizona

Appendix B

Letter of Intent
from the Phoenix Parks, Recreation and Library Department,
concerning recreation facilities
at Dreamy Draw Recreation Area

Appendix B.

PARKS, RECREATION AND LIBRARY DEPARTMENT

March 11, 1980

Colonel Gwynn A. Teague
District Engineer
Los Angeles District
U. S. Army Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Re: Dreamy Draw Dam Recreation Area

Dear Colonel Teague:

We are providing this letter to express our intent in developing cost shared recreational facilities at Dreamy Draw Dam Recreation area.

Proposed development would include approximately 80-acres of developed picnic area with equestrian trails, restrooms, ramadas, and a parking area. It is understood that the current project schedule calls for construction in October/November, 1980. It is our desire to participate in development on a cost sharing basis with the Federal Government by providing approximately $500,000 which is estimated to represent 50% of construction costs. It is understood that this is merely an estimate subject to change based upon costs at time of contract award.

We intend to operate, maintain, and make replacements of the recreational facilities provided under this program. Current total project operation and maintenance costs are estimated at $7,600 per year. Further, we understand that the executing of this letter of intent does not obligate the Federal Government in any way to approve the recreation development or funding.

Final approval of Project Plans and disposition of funds is subject to approval of the City of Phoenix Council prior to authorization for Call for Bids. Thank you for your prompt consideration of this matter.

Sincerely,

[illegible] A. Collie, Director
Parks, Recreation and Library Department

GAC/dsb

cc: Ruth Chase

125 EAST WASHINGTON STREET • PHOENIX, ARIZONA 85004 • TELEPHONE (602) 262-6861

Exhibits

Exhibit A.

Estimated Recreation First Cost,
New River and Phoenix City Streams, Arizona,
Dreamy Draw Dam

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
	Recreation Development				
1.	Picnic ramadas, 38 ft x 31 ft 4 in., 1,191 ft^2	5	EA	22,630	113,150
2.	Picnic ramadas, 19 ft x 16 ft, 304 ft^2	3	EA	7,700	23,100
3.	Picnic tables, precast concrete 20 ft x 3 ft x 4 in. thick w/benches	20	EA	1,500	30,000
4.	Picnic tables as above, 10 ft x 3 ft x 4 in.	6	EA	750	4,500
5.	Restroom, 24 ft x 34 ft 6 in., 832 ft^2 Clivus Multrum Waste Disposal ($26,760 includes 6 tanks, toilets, and 2 urinals)	1 Job	LS	103,400	103,400
6.	Assembly area, 40 ft x 70 ft; concrete	1	EA	9,000	9,000
7.	Fire rings 5 ft diameter metal	2	EA	970	1,940
8.	Barbecues, 15 ft x 3 ft x 1 ft 6 in., concrete w/schist facing	10	EA	4,500	45,000
9.	Barbecues as above, 10 ft x 3 ft x 1 ft 6 in	3	EA	3,000	9,000

Note: Abbreviations are identified at the end of the table.

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
10.	Horse tie-ups, 60 ft long x 4 ft high	3	EA	1,480	4,440
11.	Horse-watering trough, 5-ft diameter x 3 ft high, automatic fill (installed)	1	LS	1,200	1,200
12.	Bridge, steel-welded construction 40 ft x 12 ft, 480 ft^2 @ \$62 ft^2	1	EA	29,760	29,760
13.	Concrete trash receptacles	12	EA	350	4,200
14.	Access road, 2-in. asphatic concrete, aggregate base course, comp. subgrade, 24 ft wide, 3200 ft long	1	LS	75,000	75,000
15.	Safety signals	4	EA	129	520
16.	Directional signs	11	EA	129	1,420
17.	Light pole, 40 ft	5	EA	2,730	13,650
18.	Entrance gate, Type "B", 30 ft swing gate with chain	1	EA	1,850	1,850
19.	Jogging trail, graded, 4 ft wide, 2.2 mi (46,464 ft^2)	5,163	yd^2	1.10	5,680
20.	Emergency exit road, graded, 12 ft wide 1,280 lin ft	1,707	yd^2	1.00	1,710
21.	Relandscaping native plants, 5 to 10% cover	35,000	ft^2	.13	4,550

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
22.	Bollards @ pedestrian bridge	7	EA	150	1,050
23.	Standard guardrail	2,500	LF	15.50	38,750
24.	Berm construction and recontouring fill, ramada area	10,000	yd^3	3.00	30,000
25.	Earthwork, emergency exit road	6,800	yd^3	4.20	28,560
26.	2-in diameter galvanized pipe (water supply line), installed	1,600	LF	10.00	16,000
27.	Refuse dumpster, 2 yd^3	2	EA	355	710
28.	Rock shoulder, access road	2,270	yd^2	1.15	2,610
29.	85-in. x 54-in. culvert, 12-gage, installed	110	LF	75.00	8,250
30.	Gravel surface, parking area	300	yd^3	8.00	2,400
31.	Aggregate base course, service road	210	Ton	10.00	2,100
32.	Earthwork, access road	11,300	yd^3	4.20	47,460
	Subtotal, Recreation Development				660,960

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
	Equestrian Underpass				
1.	Clearing & grubbing	.45	ACRES	4,840	2,180
2.	Signing, detour	1 JOB	LS	500	500
3.	Excavation				
	Detour	250	yd^3	3	750
	Underpass	122	yd^3	3	365
4.	Fill, compacted				
	Detour	2,740	yd^3	11	30,140
	Underpass	850	yd^3	11	9,350
5.	Aggregate base course	468	TON	10	4,680
6.	Asphalt concrete	187	TON	35	6,545
7.	13 ft, 2 in. span x 11 ft rise, multiplate underpass #8 gage	110	LF	380	41,800
8.	Trail fill-in underpass	40	yd^3	9	360
9.	Esthetic treatment (planting)	1 JOB	LS	4,800	4,800
	Subtotal, Equestrian Underpass				101,470

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
	Electrical Services				
1.	Primary Service:				
	Primary service cable, 5kV-2 conductors	6,000	LF	5.70	34,200
	Excavation and Backfill	6,000	LF	2.10	12,600
	Subtotal, Primary Service				46,600
	Restroom				
1.	Primary transformer, oil filled, 10kVA, 480V- 120/240V, 1Ø, 3W grounded, w/fused switch and lighting arrestors	1	EA	1,730	1,730
2.	Secondary:				
	Service meter socket and service disconnect, 100A-120/240V-1Ø-3W	1	EA	410	410
	Service ground	1	EA	680	680
3.	Lighting Control:				
	Manual time switch, 0-5 min., 1P-20A, 120V	2	EA	98	195
	Time switch, 120V, astronomic dial	1	EA	275	275
	Lighting contactor, 120V, 4 Pole	1	EA	275	275
4.	Duplex receptacle, indoor type, 120V - 15A	1	EA	30	30
5.	Hand dryer w/o Heater, 120V	2	EA	165	330

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
6.	Switch, 1P - 20A, 120V	1	EA	35	35
	Switch, 2P - 30A, 480V	2	EA	275	550
7.	Lighting fixture Vandal-resistant, fluorescent fixture w/2 - F40 lamps - 120V	6	EA	300	1,800
	150W, 120V - vandal-resistant HPS fixture	3	EA	410	1,230
8.	Panelboard, 120/240V 1Ø, 3W, 18P-100A 7500 AIC	1	EA	950	950
	Subtotal, Restroom				8,490
	Group Ramadas				
1.	Lighting control:				
	Photocell	1	EA	205	205
	Time switch, 240V, astronomic dial	1	EA	275	275
	Lighting contactor, 240V, 2 Pole	2	EA	275	550
2.	Duplex receptacle locked cover, W.P., 120V - 15A w/GFI	5	EA	200	1,000
3.	Lighting fixtures, 150W, 240V vandal-resistant HPS fixture	10	EA	475	4,750
4.	Transformer, 2kVA, 240V - 480/240V 1Ø 3W grounded	2	EA	285	570
	Subtotal, Group Ramada				7,350

Exhibit A. (Continued)

Item No.	Description	Estimated Quantity	Unit	Cost	
				Unit	Total
	Individual Ramadas				
1.	Duplex receptacle with G.F.I.	3	EA	200	600
2.	Transformer, 5kVA, 480V 120/240V 3W 1Ø	2	EA	700	1,400
3.	Switch 600V, 2P-30A	3	EA	400	1,200
4.	Panelboard B, C, & D	3	EA	1,500	4,500
5.	Photocell	3	EA	200	600
6.	Time clocks and contactors	3	EA	400	1,200
7.	480V conduit and conductors in concrete encasement	1,500	LF	7	10,500
8.	120/240V conduit and conductors in concrete encasement	150	LF	6	900
9.	H.P.S. type luminaire vandalproof type	6	EA	450	2,700
10.	Wiring, ramadas grounding	1	LS	2,000	2,000
	Subtotal, Individual Ramadas				25,600

Exhibit A. (Continued)

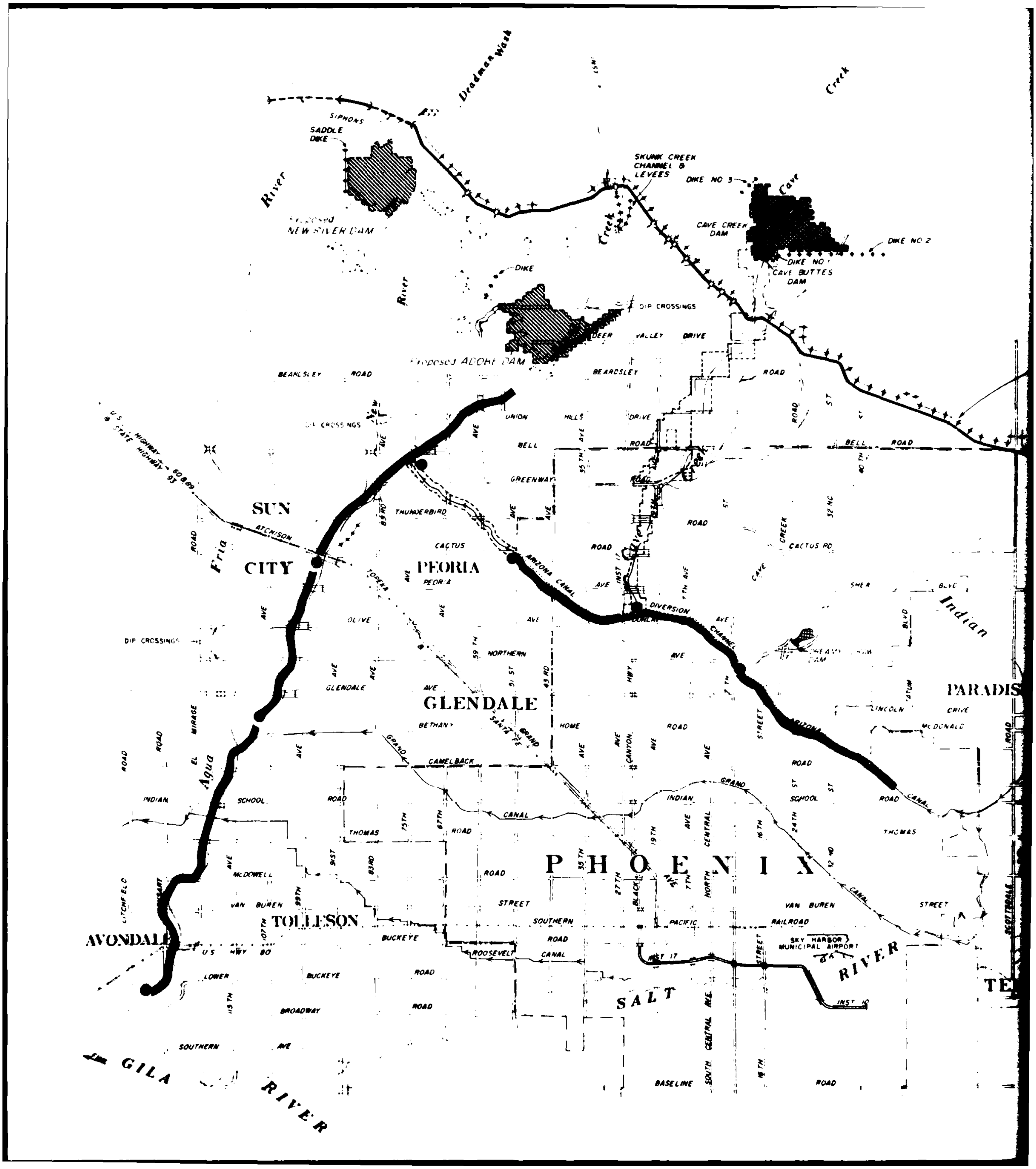
Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
	Assembly Area				
1.	Lighting fixture: 150W, 240V, vandal-resistant HPS fixture	5	EA	476	2,380
2.	Duplex receptacle, locked cover, W.P., 120V - 15A w/GFI	1	EA	200	200
3.	Speaker outlet box	3	EA	46	140
	Subtotal, Assembly Area				2,720
	Parking Area				
1.	Lighting standard 40 ft H w/400W, 480V, HPS luminaire and lamp	5	EA	2,730	13,650
	Subtotal, Parking Area				13,650
	Conduit:				
	4 in. type 1: PVC	500	LF	10.90	5,450
	2 in. RGS	20	LF	5.50	110
	1-1/2 in. RGS	500	LF	3.45	1,725
	1 in. RGS	500	LF	2.75	1,375
	3/4 in. RGS	500	LF	2.05	1,025
	1/2 in. RGS	300	LF	1.40	420

Exhibit A. (Continued)

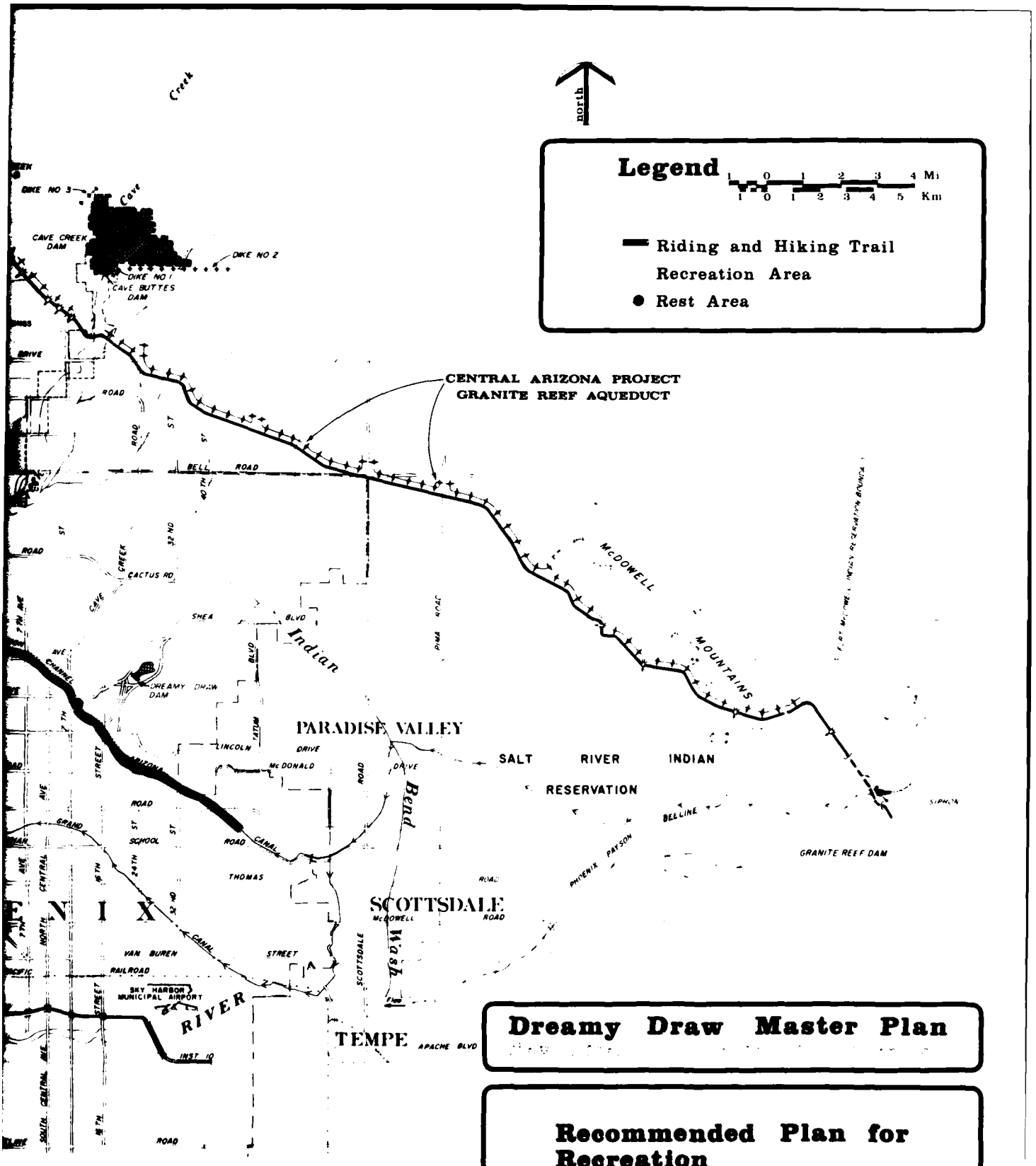
Item No.	Description	Estimated Quantity	Unit	Cost Unit	Cost Total
	Conductor:				
	No. 12 AWG	4,000	LF	.42	1,680
	No. 10 AWG	2,500	LF	.56	1,400
	No. 8 AWG	4,000	LF	.69	2,760
	No. 2 AWG	50	LF	1.70	85
	Subtotal, Conduit and Conductor				16,030
	Subtotal, Electrical Services				120,640
	Subtotal Summary:				
	Recreation development				660,960
	Equestrian underpass				101,470
	Electrical services				120,640
	Subtotal				883,070
	Contingency				132,430
	Total (Construction cost)				1,015,500
	Engineering & design				177,000
	Supervision & administration				80,000
	Lands				0
	TOTAL RECREATION FIRST COST (cost shared)				1,272,500
	Federal contribution for:				
	Cost sharing				636,250
	Total Contribution				636,250
	City of Phoenix contribution for:				
	Cost sharing				636,250
	Lands				0
	Total Contribution				636,250

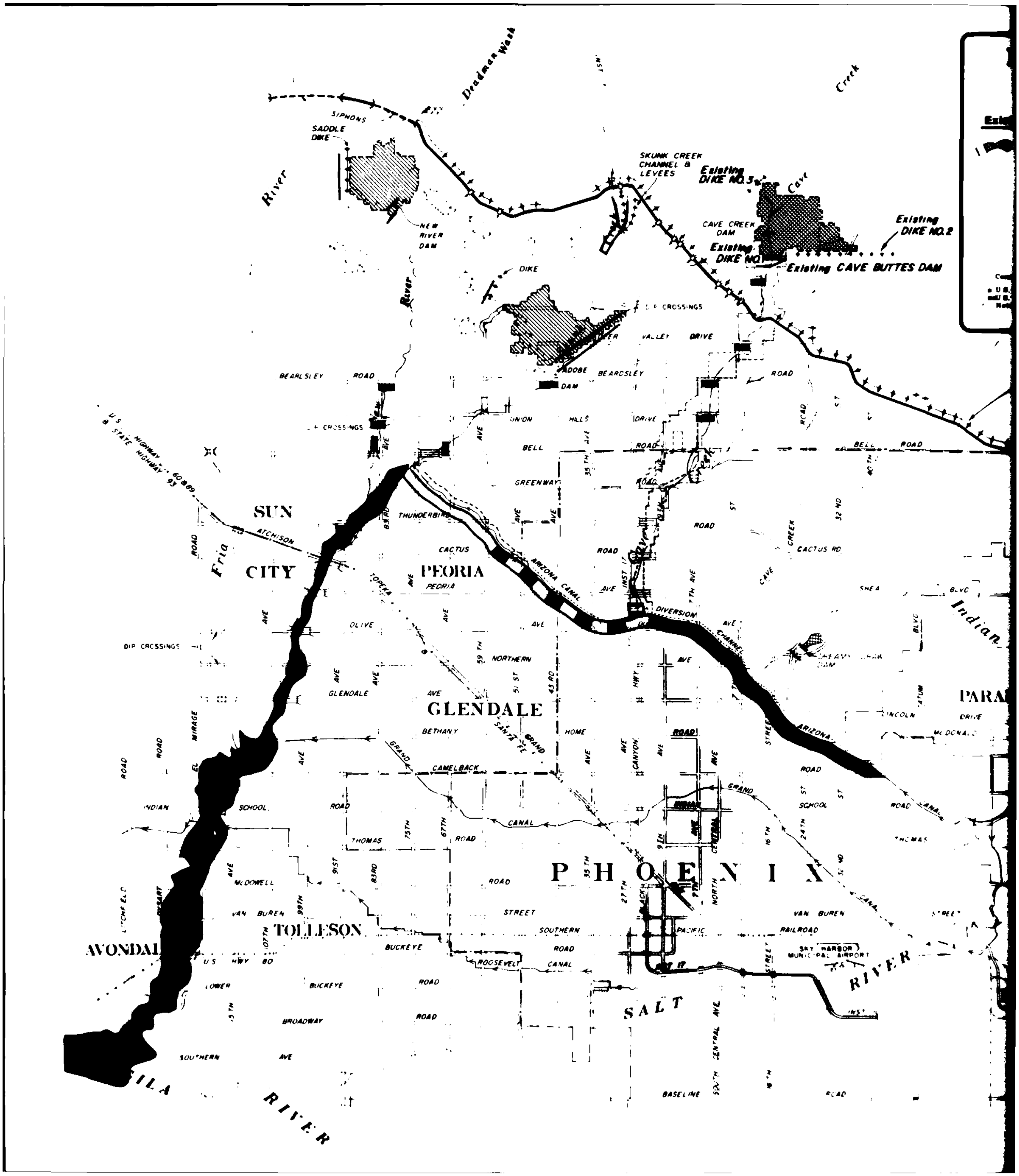
LS means lump sum. LF means linear foot.

Plates



Deadman Wash
Cave Creek
SIPHONS
SADDLE DIKE
River
Proposed NEW RIVER DAM
SKUNK CREEK CHANNEL & LEVEES
DIKE NO 3
CAVE CREEK DAM
DIKE NO 2
DIKE NO 1
CAVE BUTTES DAM
DIKE
DIP CROSSINGS
Proposed ADOBE DAM
DEER VALLEY DRIVE
BEARDSLEY ROAD
U.S. HIGHWAY 60-89 & STATE HIGHWAY 93
UNION HILLS DRIVE
BELL ROAD
GREENWAY
THUNDERBIRD
SUN CITY
ATCHISON
CACTUS
PEORIA
ARIZONA CANAL
DIVERSION CHANNEL
CACTUS RD
SHEA BLVD
Indian
Agua Fria
OLIVE
NORTHERN
GLENDALE
BETHANY HOME ROAD
PARADISE
LINCOLN DRIVE
McDONALD
CAMELBACK ROAD
INDIAN SCHOOL ROAD
THOMAS ROAD
GRAND CANAL
PHOENIX
McDOWELL ROAD
VAN BUREN STREET
TOLLESON
AVONDALE
SOUTHERN PACIFIC RAILROAD
BUCKEYE ROAD
US HWY 80
SKY HARBOR MUNICIPAL AIRPORT
ROOSEVELT CANAL
SALT RIVER
LOWER BUCKEYE ROAD
BROADWAY ROAD
SOUTHERN AVE
BASELINE ROAD
GILA RIVER
SCOTTSDALE


north
Legend
1 0 1 2 3 4 Mi
1 0 1 2 3 4 5 Km
Riding and Hiking Trail
Recreation Area
Rest Area
CENTRAL ARIZONA PROJECT
GRANITE REEF AQUEDUCT
DIKE NO 3
Cave
CAVE CREEK DAM
DIKE NO 2
DIKE NO 1
CAVE BUTTES DAM
BELL ROAD
CACTUS RD
SHEA BLVD
Indian
DREAMY DRAW DAM
PARADISE VALLEY
McDONALD DRIVE
McDOWELL
MOUNTAINS
SALT RIVER INDIAN RESERVATION
BEELINE
PHOENIX PAYSON
GRANITE REEF DAM
SIPHON
Bend
SCOTTSDALE
McDOWELL ROAD
THOMAS ROAD
SCHOOL
GRAND CANAL
CENTRAL AVE
VAN BUREN STREET
RAILROAD
SKY HARBOR MUNICIPAL AIRPORT
RIVER
TEMPE
APACHE BLVD
INST 10
Dreamy Draw Master Plan
Recommended Plan for Recreation
US Army Corps of Engineers
Plate 1



Deadman Wash
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Existing DIKE NO.3
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Existing DIKE NO.2
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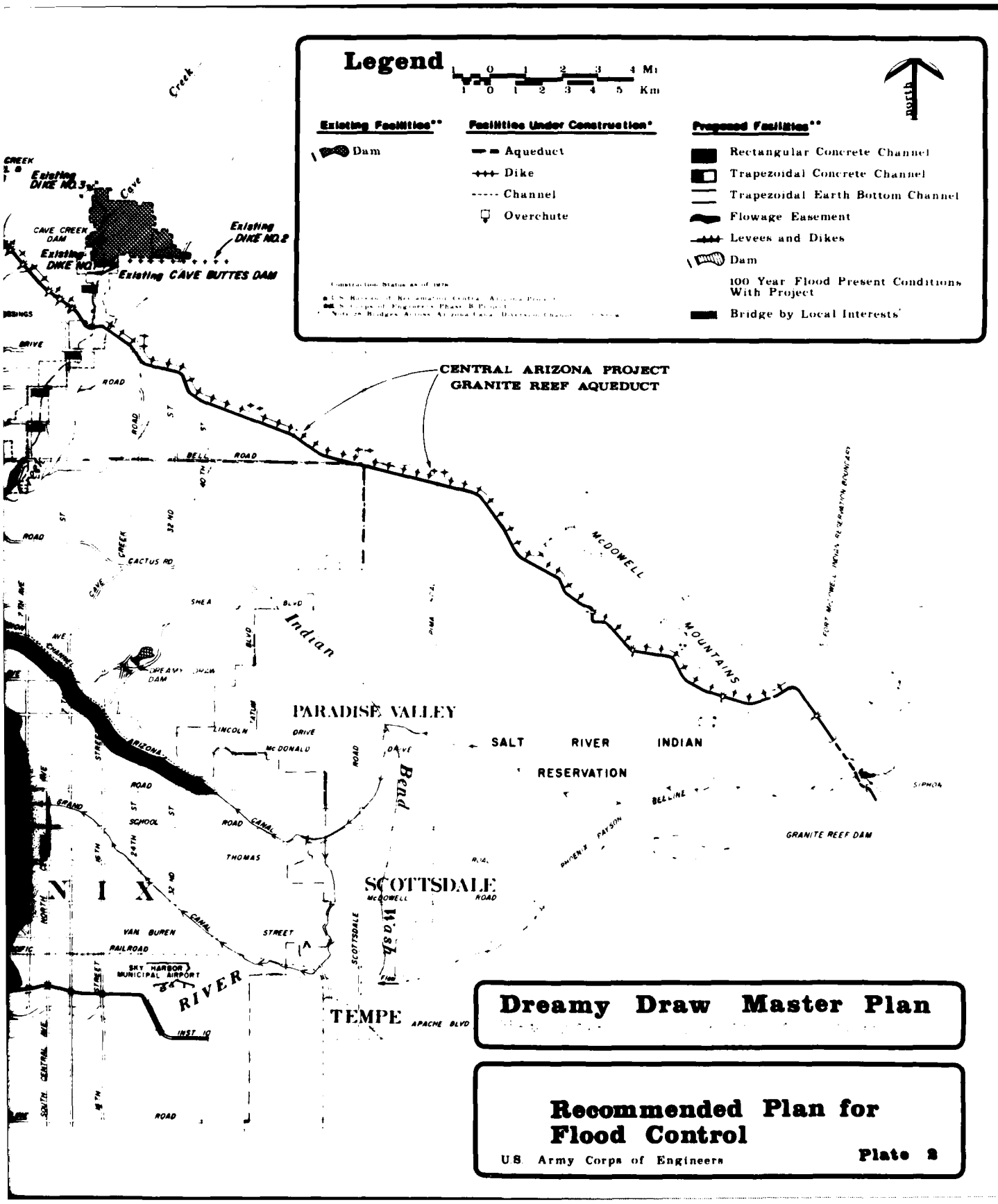
NORTHERN
GLENDALE
BETHANY
CAMELBACK
INDIAN SCHOOL
THOMAS
McDOWELL
VAN BUREN
TOLLESON
AVONDALE
BUCKEYE
LOWER BUCKEYE
BROADWAY
SOUTHERN AVE
PHOENIX
SALT RIVER
SKY HARBOR MUNICIPAL AIRPORT
BASELINE ROAD
GILA RIVER
Indian

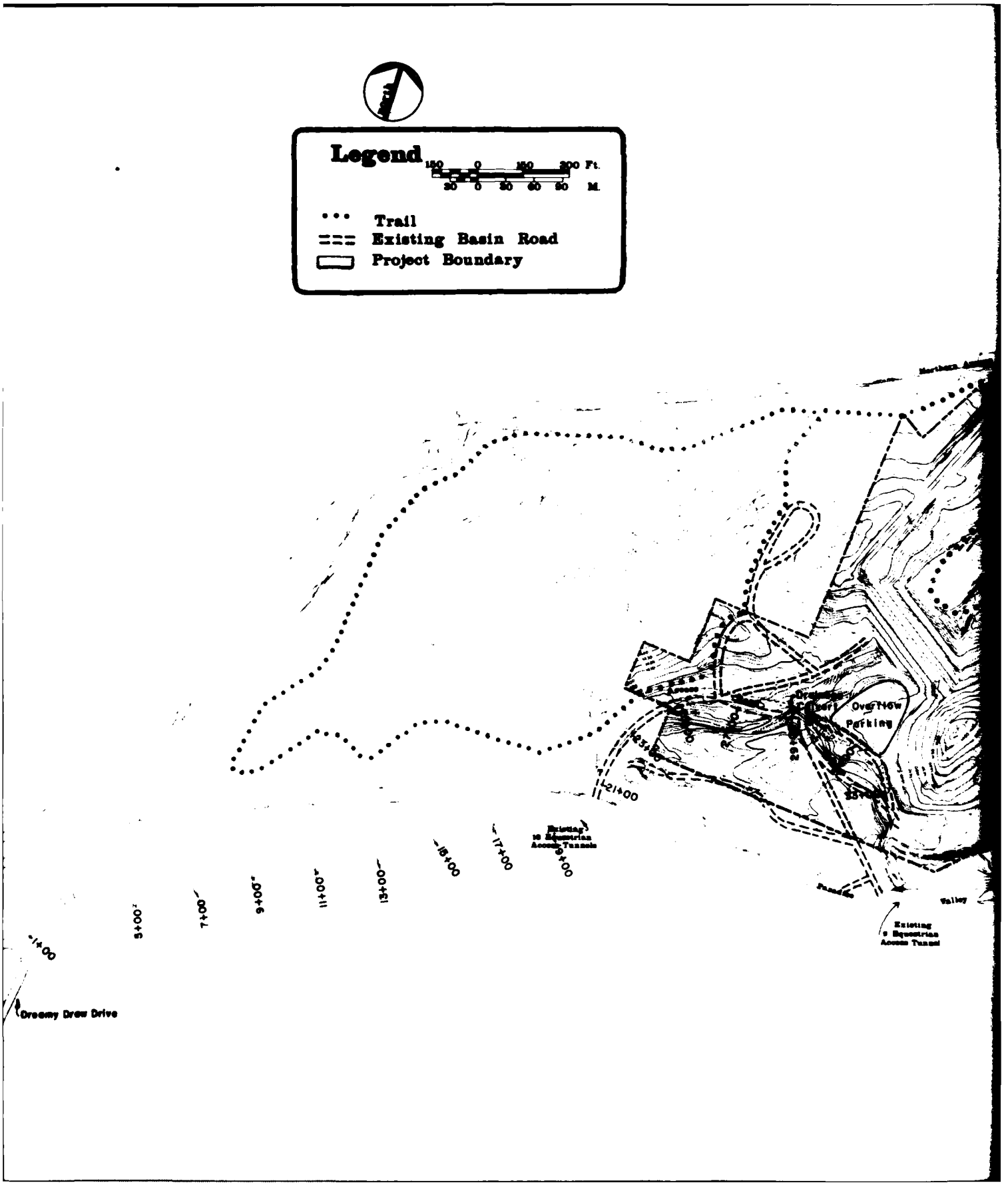


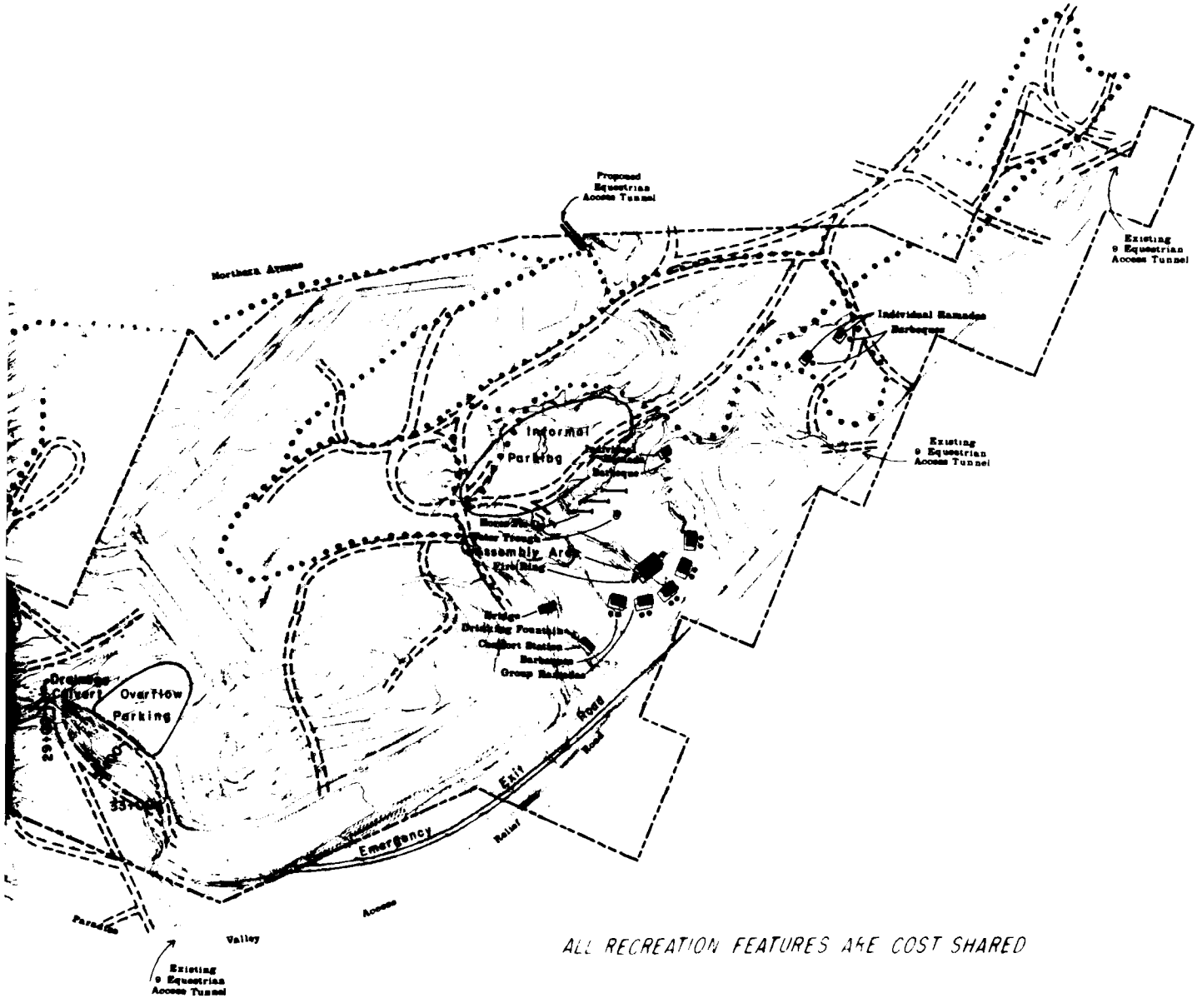
Dreamy Draw Master Plan

Recommended Plan for Flood Control

U.S. Army Corps of Engineers

Plate 2


Legend
150 0 150 300 Ft.
50 0 50 100 150 M.
Trail
Existing Basin Road
Project Boundary
Overflow Parking
Existing Equestrian Access Tunnel
Dreamy Draw Drive



ALL RECREATION FEATURES ARE COST SHARED

Dreamy Draw Master Plan

Site Plan

U.S Army Corps of Engineers

Plate 3

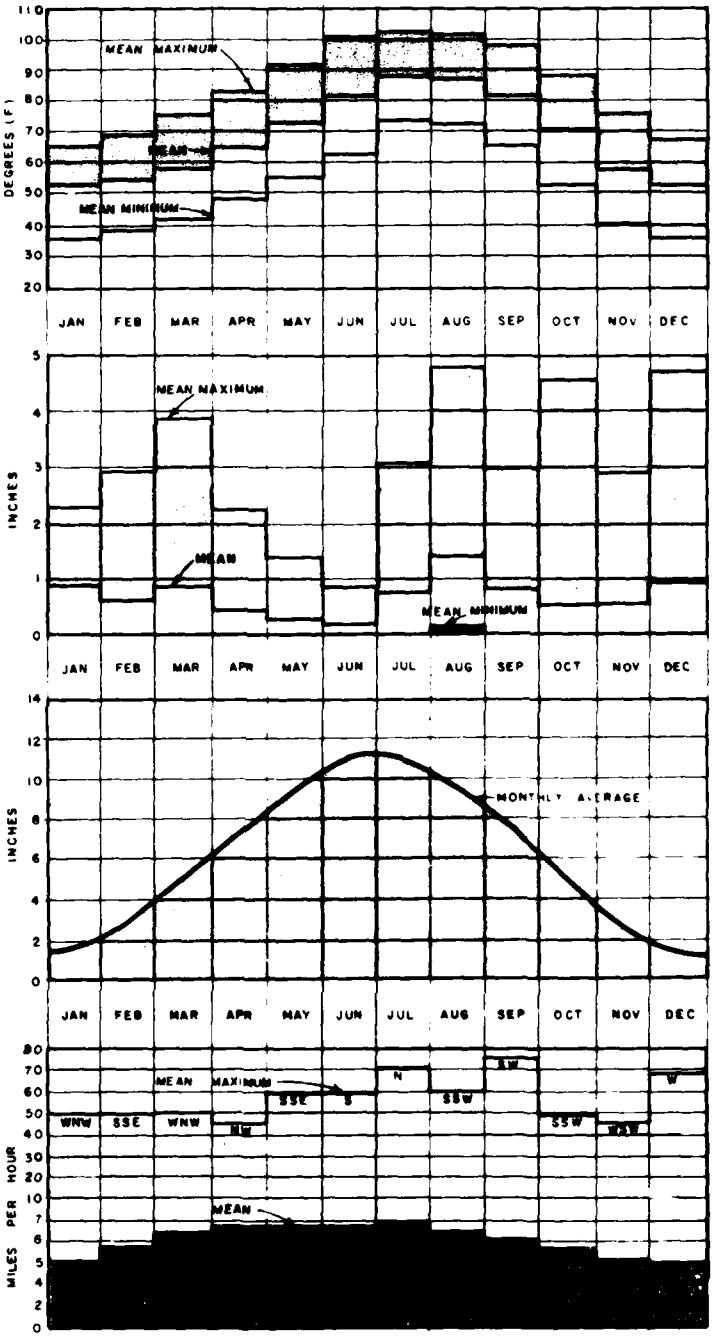
CLIMATOLOGIC SUMMARY

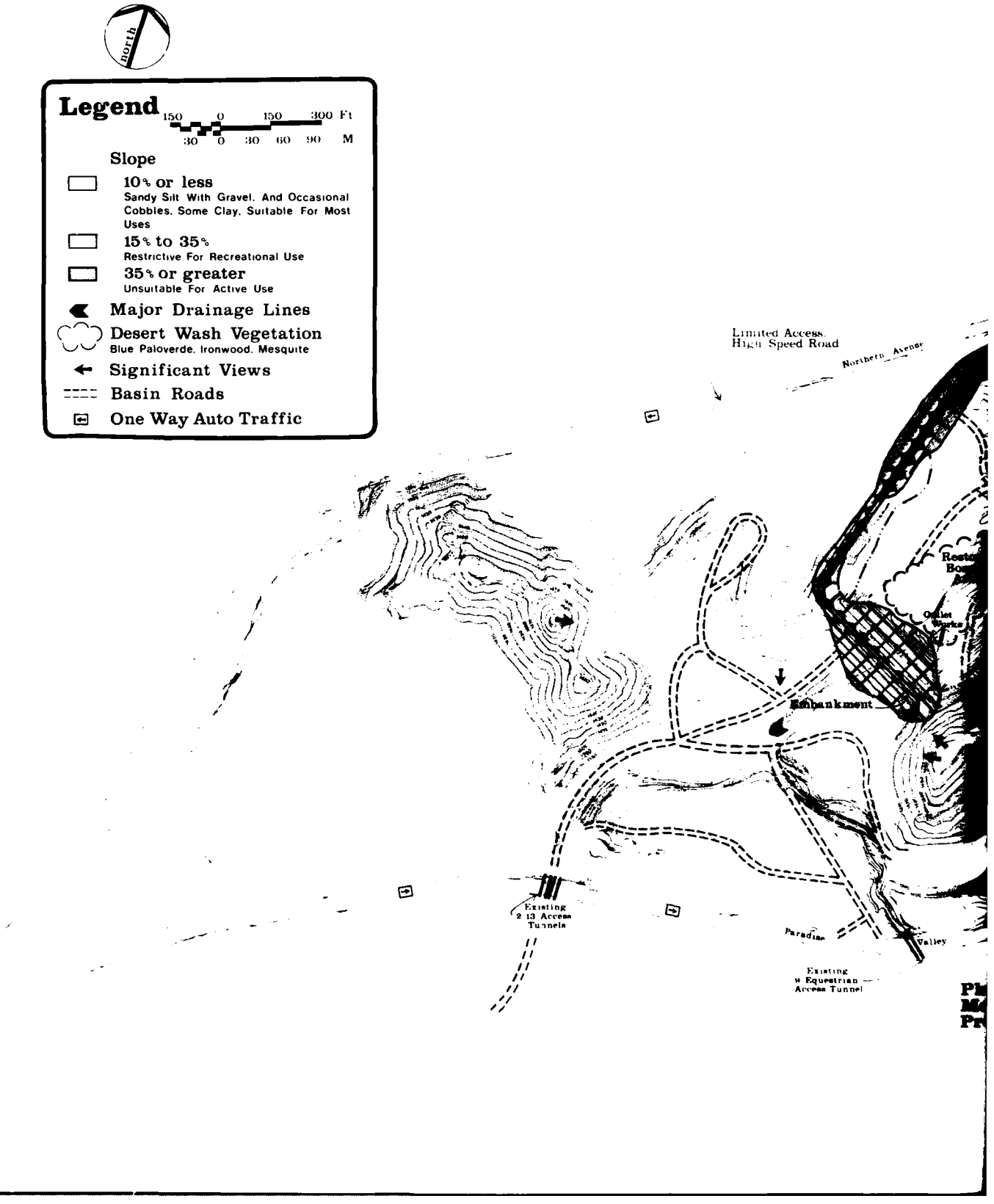
TEMPERATURE

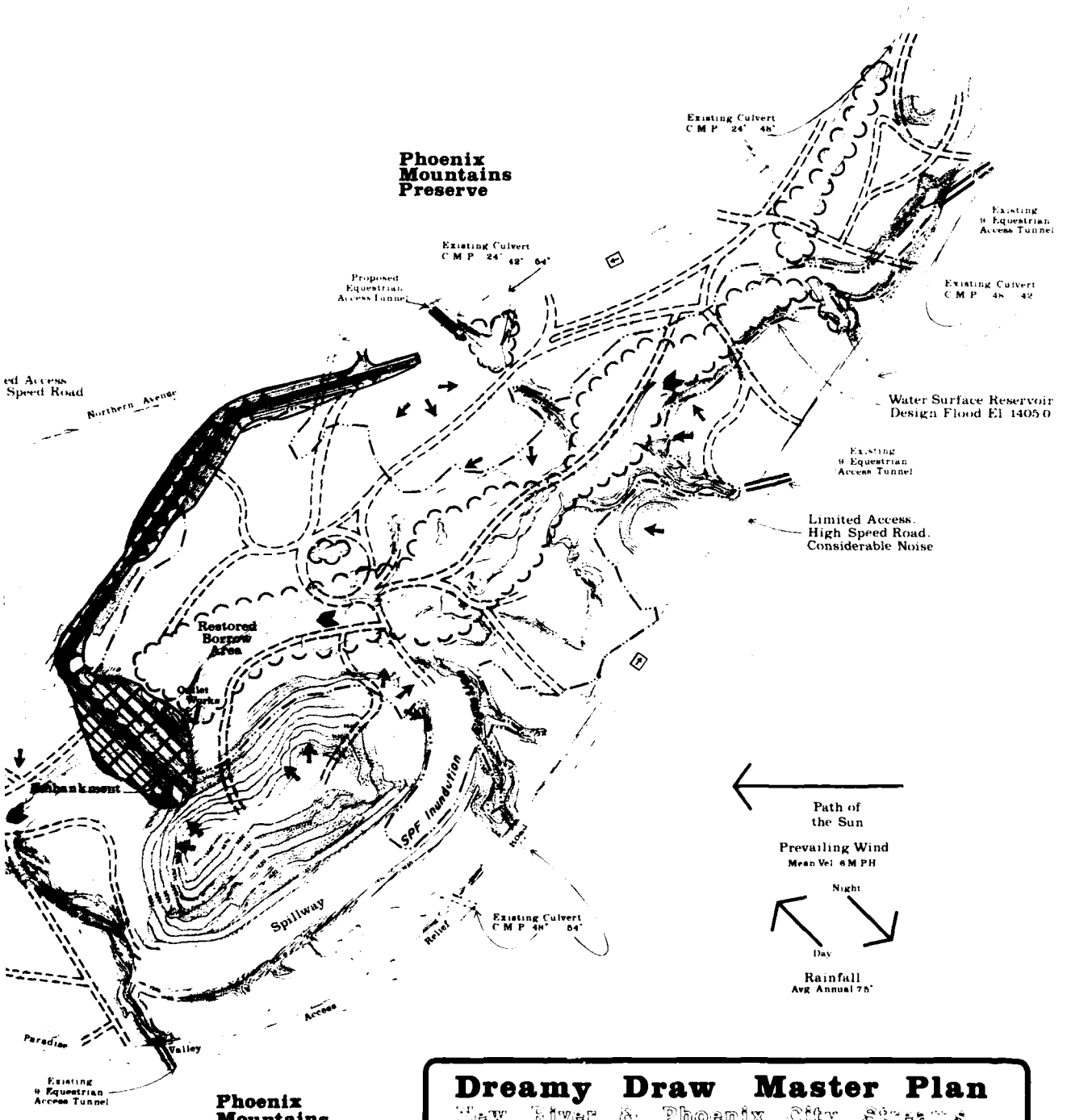
PRECIPITATION

EVAPORATION

WIND




north
Legend
150 0 150 300 Ft
30 0 30 60 90 M
Slope
10% or less
Sandy Silt With Gravel, And Occasional Cobbles, Some Clay, Suitable For Most Uses
15% to 35%
Restrictive For Recreational Use
35% or greater
Unsuitable For Active Use
Major Drainage Lines
Desert Wash Vegetation
Blue Paloverde, Ironwood, Mesquite
Significant Views
Basin Roads
One Way Auto Traffic
Limited Access
High Speed Road
Northern Avenue
Existing
2 13 Access
Tunnels
Existing
8 Equestrian
Access Tunnel
Valley



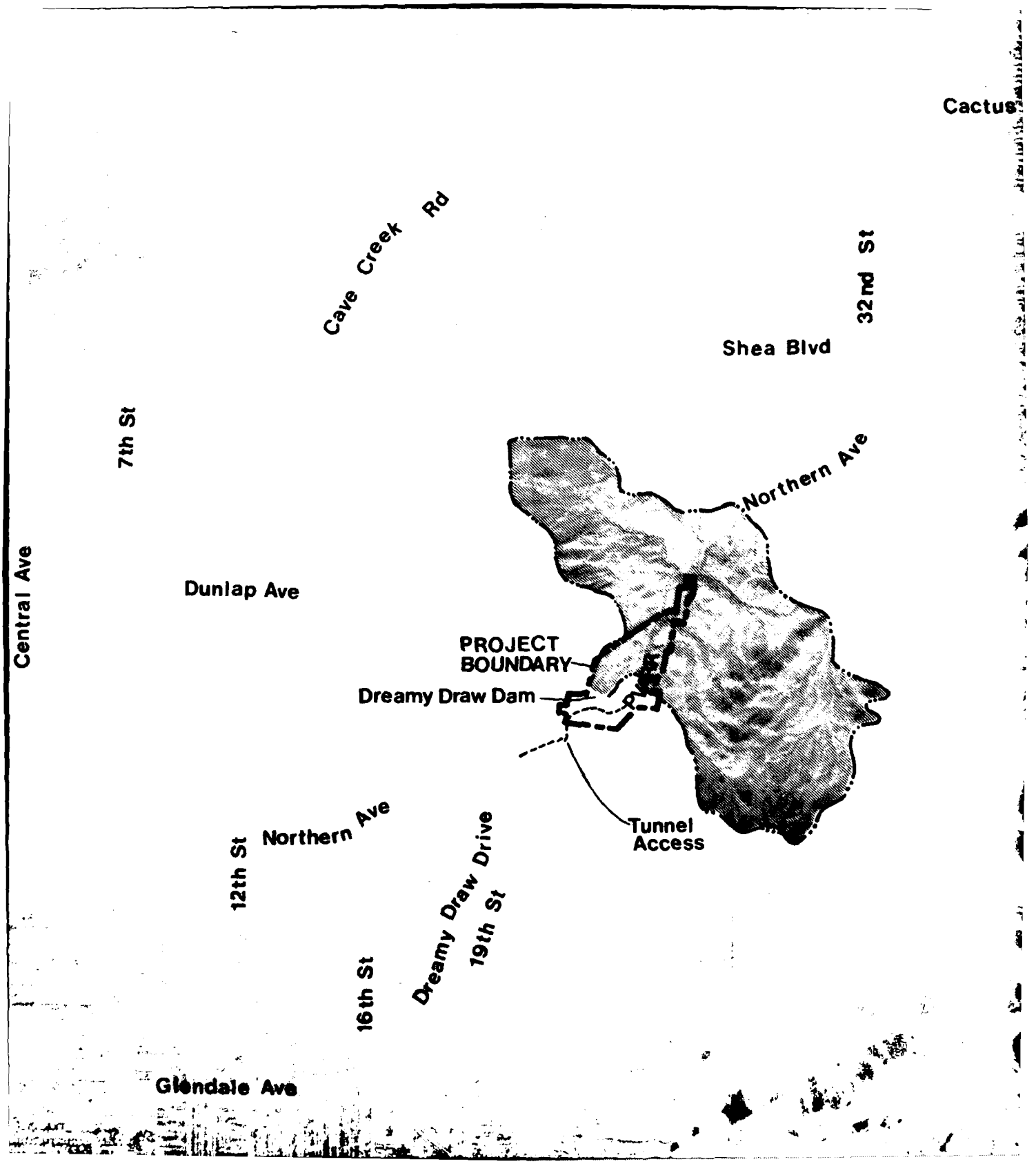
Dreamy Draw Master Plan

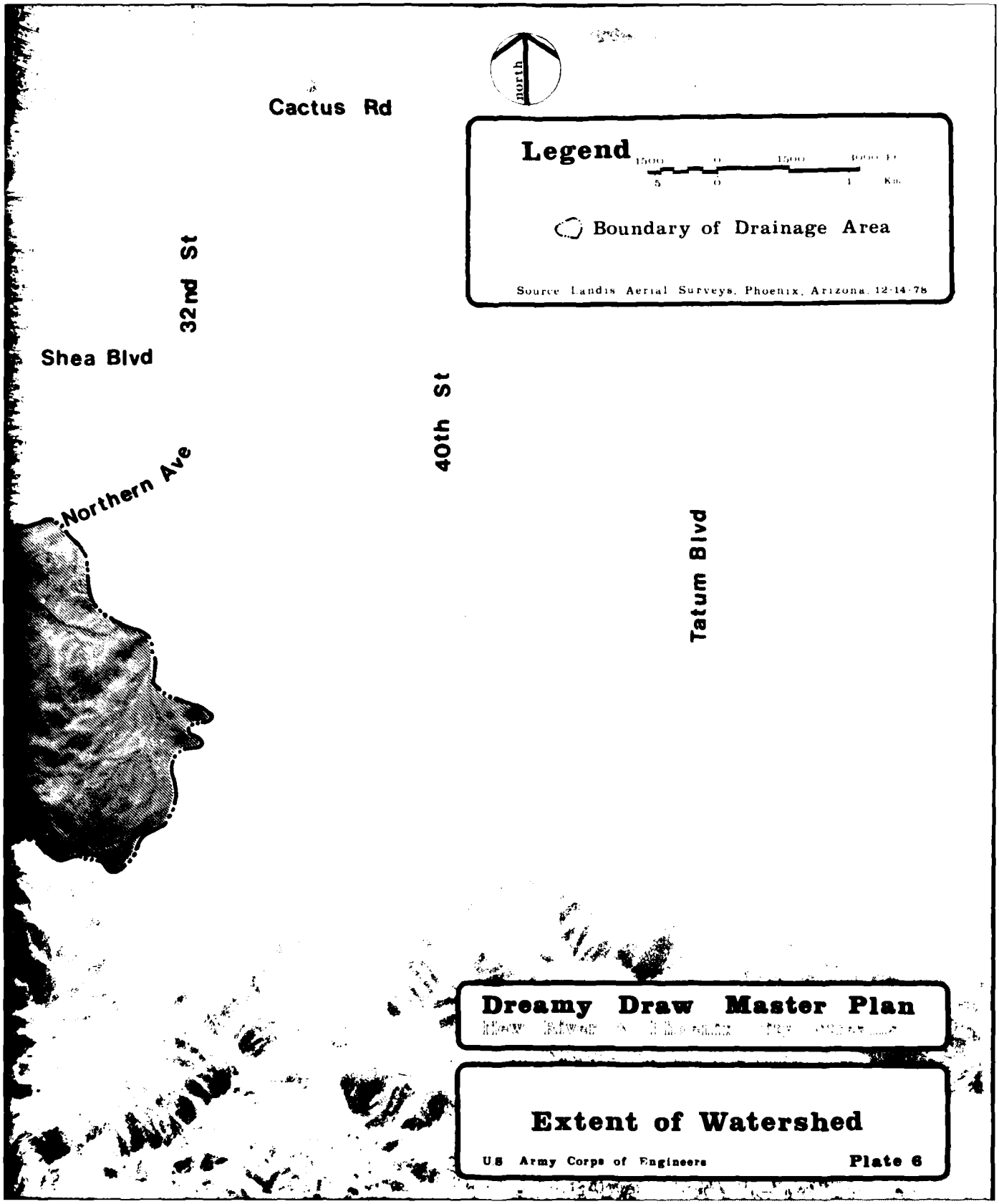
New River & Phoenix City Streams

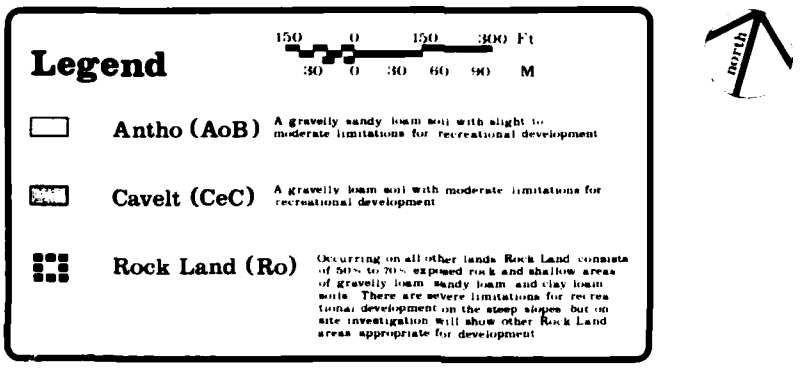
Site Analysis

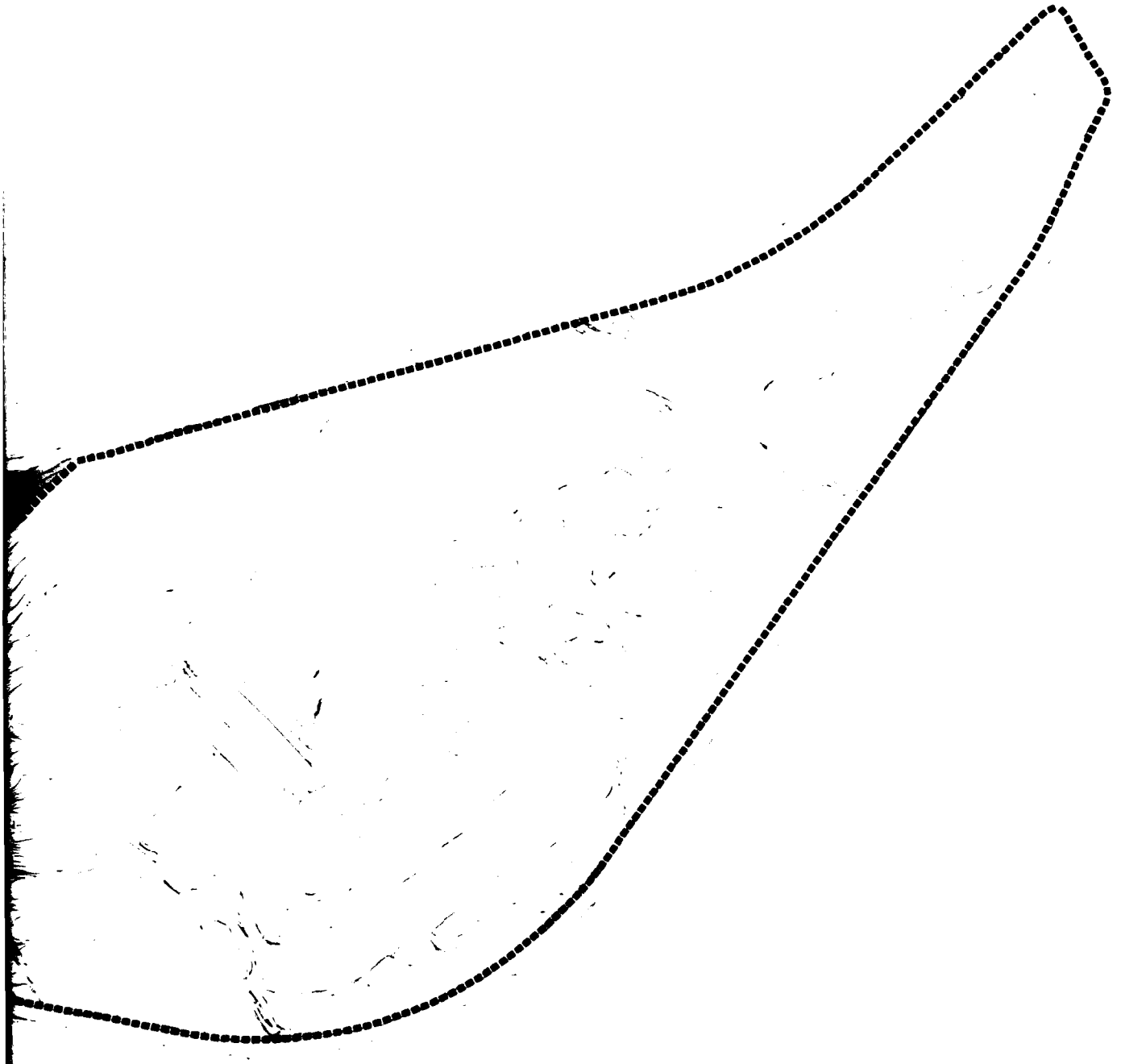
US Army Corps of Engineers

Plate 5


Cactus
Cave Creek Rd
32nd St
Shea Blvd
7th St
Central Ave
Dunlap Ave
Northern Ave
PROJECT BOUNDARY
Dreamy Draw Dam
Tunnel Access
12th St
Northern Ave
Dreamy Draw Drive
19th St
16th St
Glendale Ave


north
Cactus Rd
Legend
1500 0 1500 3000 Ft
5 0 1 Km
Boundary of Drainage Area
Source Landis Aerial Surveys, Phoenix, Arizona. 12-14-78
32nd St
Shea Blvd
40th St
Northern Ave
Tatum Blvd
Dreamy Draw Master Plan
Extent of Watershed
U.S. Army Corps of Engineers
Plate 6


Legend
150 0 150 300 Ft
30 0 30 60 90 M
north
Antho (AoB)
A gravelly sandy loam soil with slight to moderate limitations for recreational development
Cavelt (CeC)
A gravelly loam soil with moderate limitations for recreational development
Rock Land (Ro)
Occurring on all other lands Rock Land consists of 50% to 70% exposed rock and shallow areas of gravelly loam sandy loam and clay loam soils There are severe limitations for recreational development on the steep slopes but on site investigation will show other Rock Land areas appropriate for development



Dreamy Draw Master Plan

New River & Phoenix City Streams

Soil Association Map*

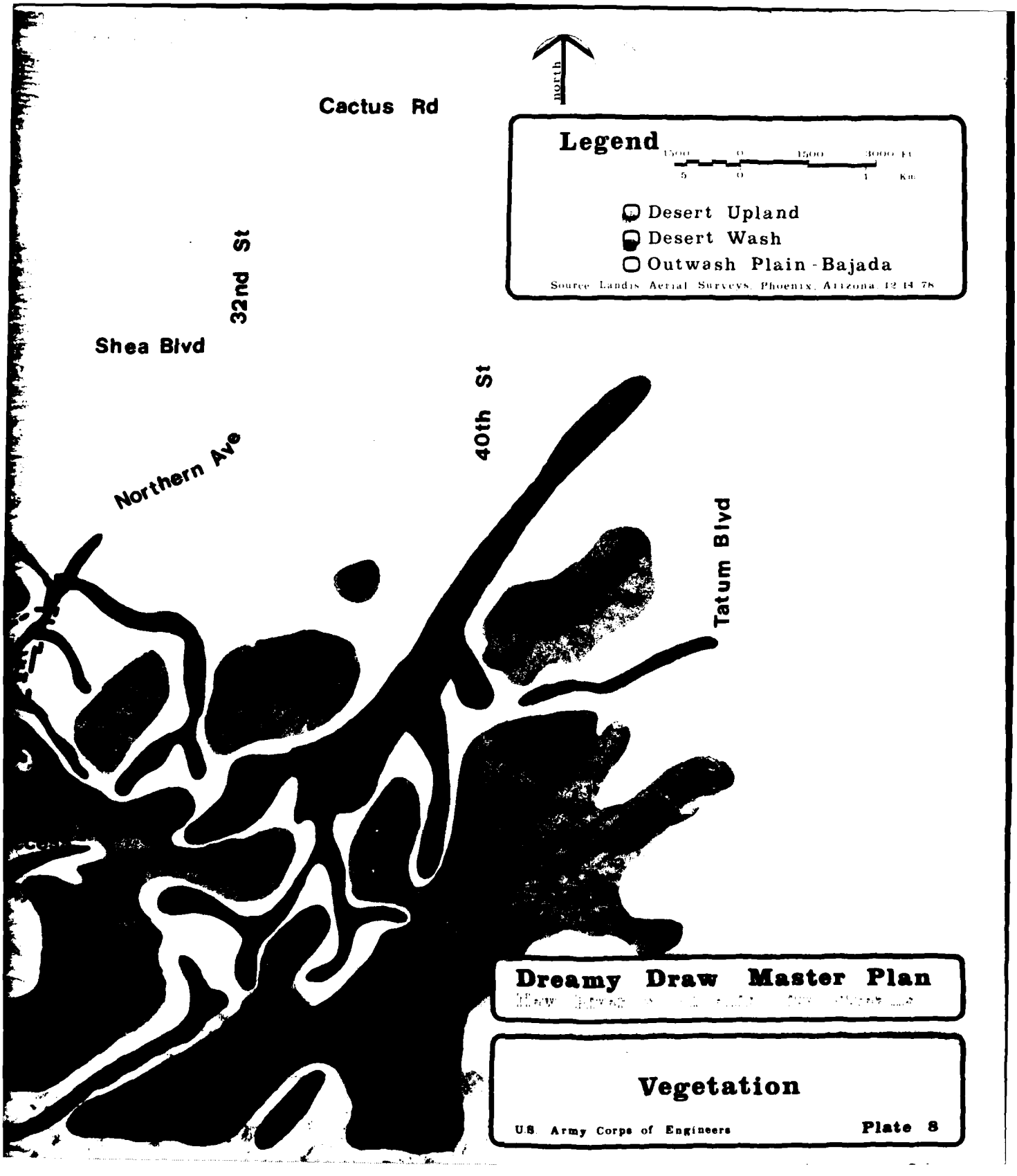
General guidelines not intended to be used as a substitute for onsite investigation

U.S. Army Corps of Engineers

Plate 7

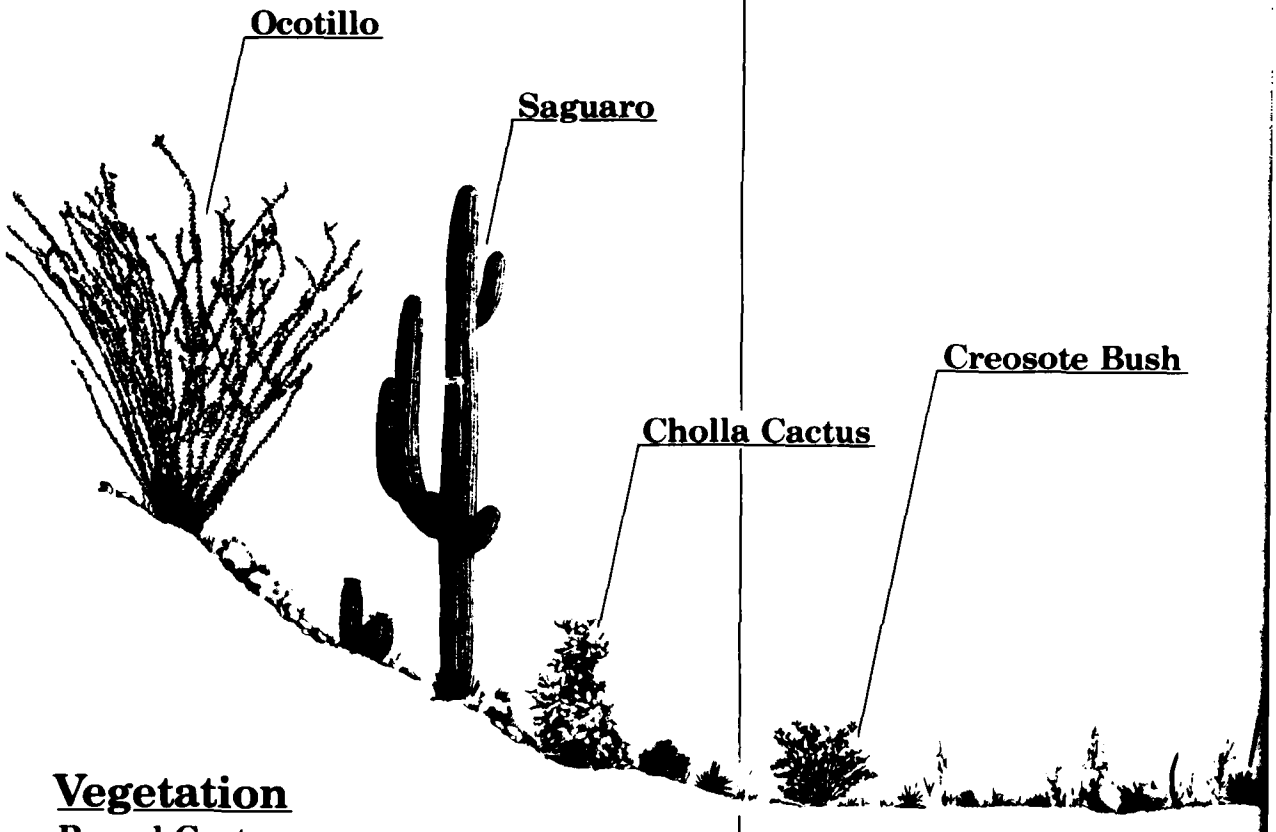
* Soil Conservation Service - Soil Survey Eastern Maricopa and Northern Pinal Counties Area Arizona U.S. Dept of Agriculture November 1974

Cactu
Cave Creek Rd
32nd St
Shea Blvd
7th St
Northern Ave
Central Ave
Dunlap Ave
PROJECT
BOUNDARY
Northern Ave
12th St
19th St
16th St
Glendale Ave


north
Cactus Rd
Legend
1500 0 1500 3000 Ft
5 0 1 Km
Desert Upland
Desert Wash
Outwash Plain - Bajada
Source: Landis Aerial Surveys, Phoenix, Arizona 12-14-78
32nd St
Shea Blvd
40th St
Northern Ave
Tatum Blvd
Dreamy Draw Master Plan
Vegetation
U.S. Army Corps of Engineers
Plate 8

Desert Upland

MIXED DESERT SHRUBS, TREES AND CACTI



Vegetation

Barrel Cactus
Bursage
Cholla Cactus
Foothill Palo Verde
Hedgehog Cactus
Ocotillo
Saguaro

Wildlife

Coyote
Jackrabbit
Song Birds
Wood Rat

Outwash Plain-Baj

PREDOMINANTLY NATURAL DES
TRAVERSED BY A DESERT WAS

Vegetation

Brittlebush
Creosote Bush
Grasses
Little Leaf Palo Verde

Wildlife

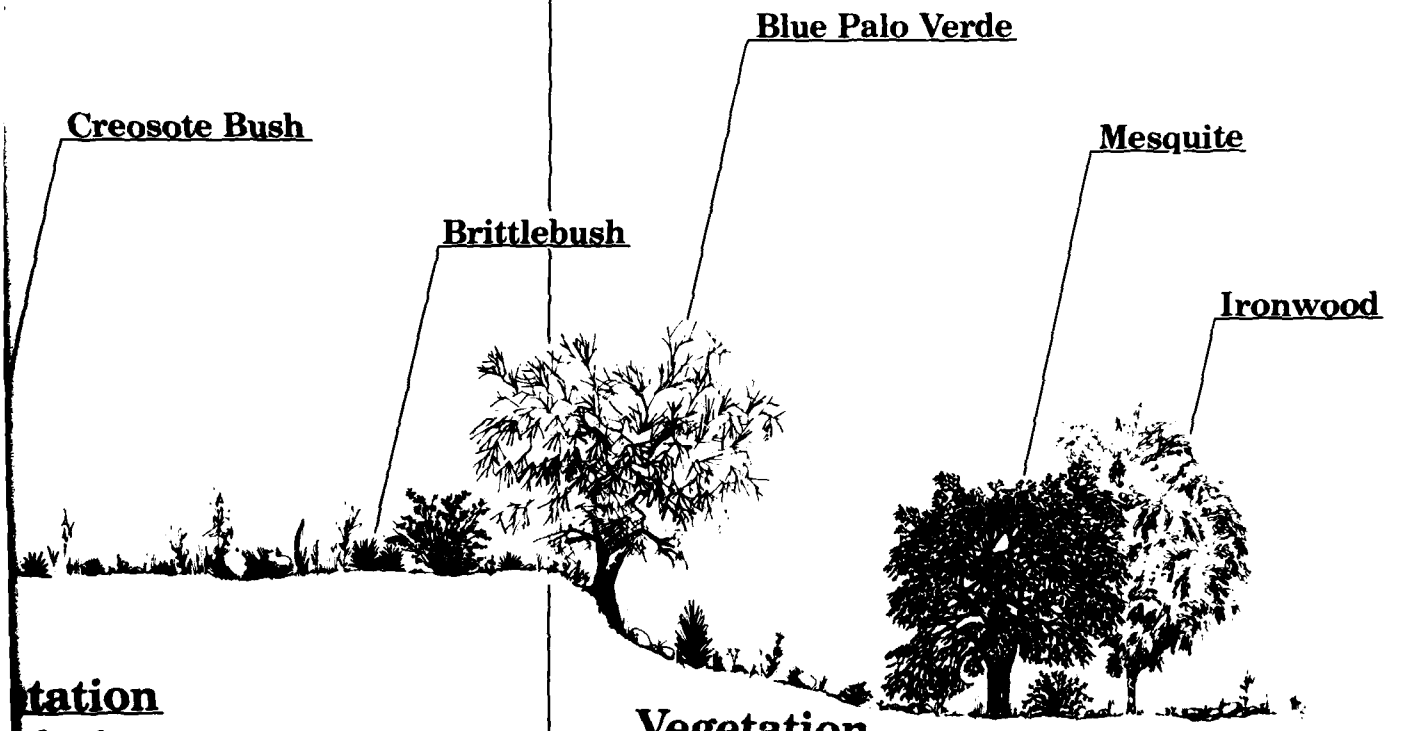
Collared Lizard
Coyote
Desert Cottontail
Diamond-Back Ra
Gambel's Quail
Ground Squirrel
Road Runner

ıtwash Plain-Bajada

REDOMINANTLY NATURAL DESERT,
TRAVERSED BY A DESERT WASH

Desert Wash

USUALLY TREE-LINED BANKS



ıtation

ebush
ote Bush
es
Leaf Palo Verde

Wildlife

Collared Lizard
Coyote
Desert Cottontail
Diamond-Back Rattlesnake
Gambel's Quail
Ground Squirrel
Road Runner

Vegetation

Blue Palo Verde
Burrobrush
Desert Broom
Desert Thorn
Ironwood
Mesquite

Wildlife

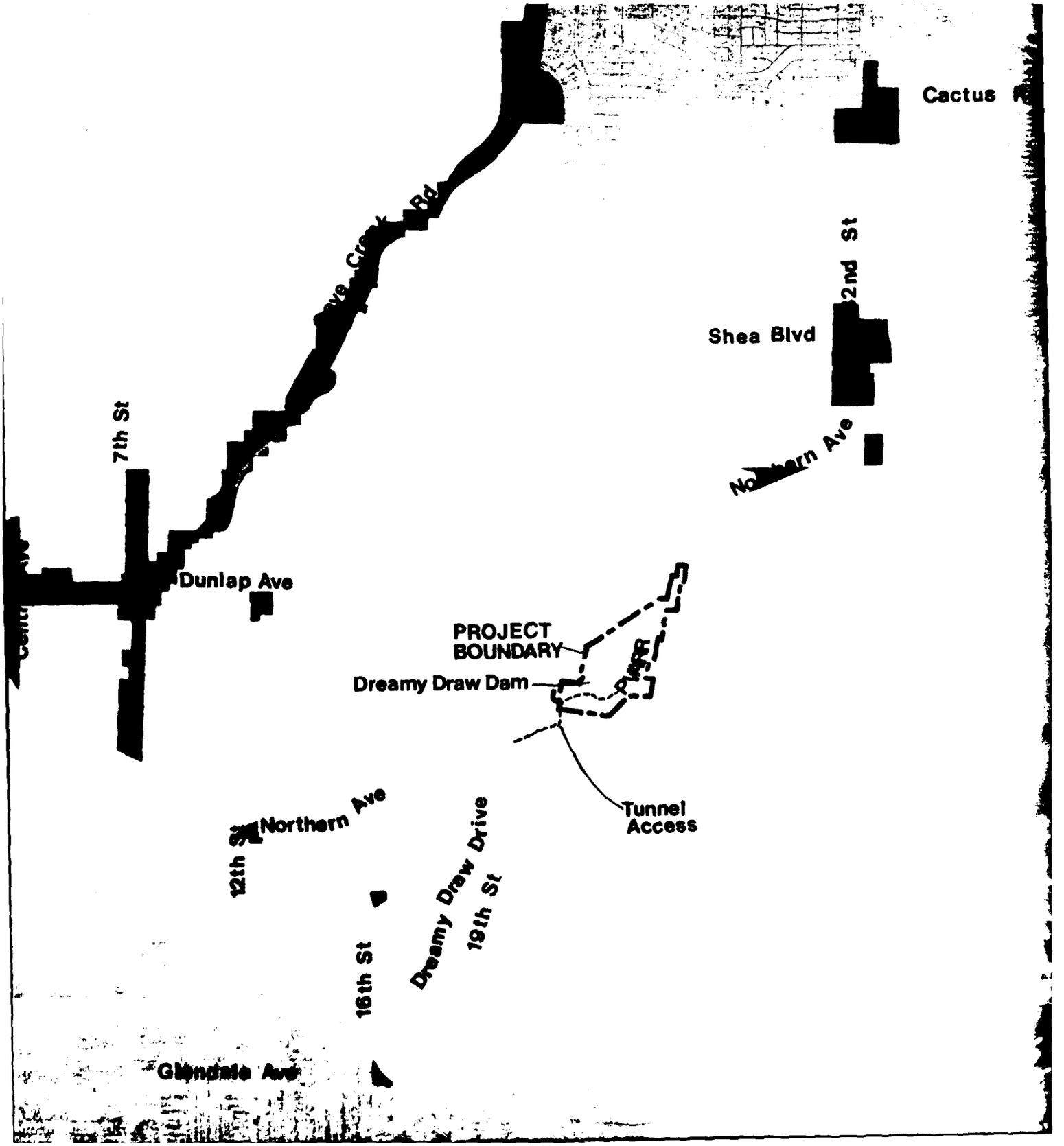
Gambel's Quail
Mourning Dove
Rock Pocket Mouse

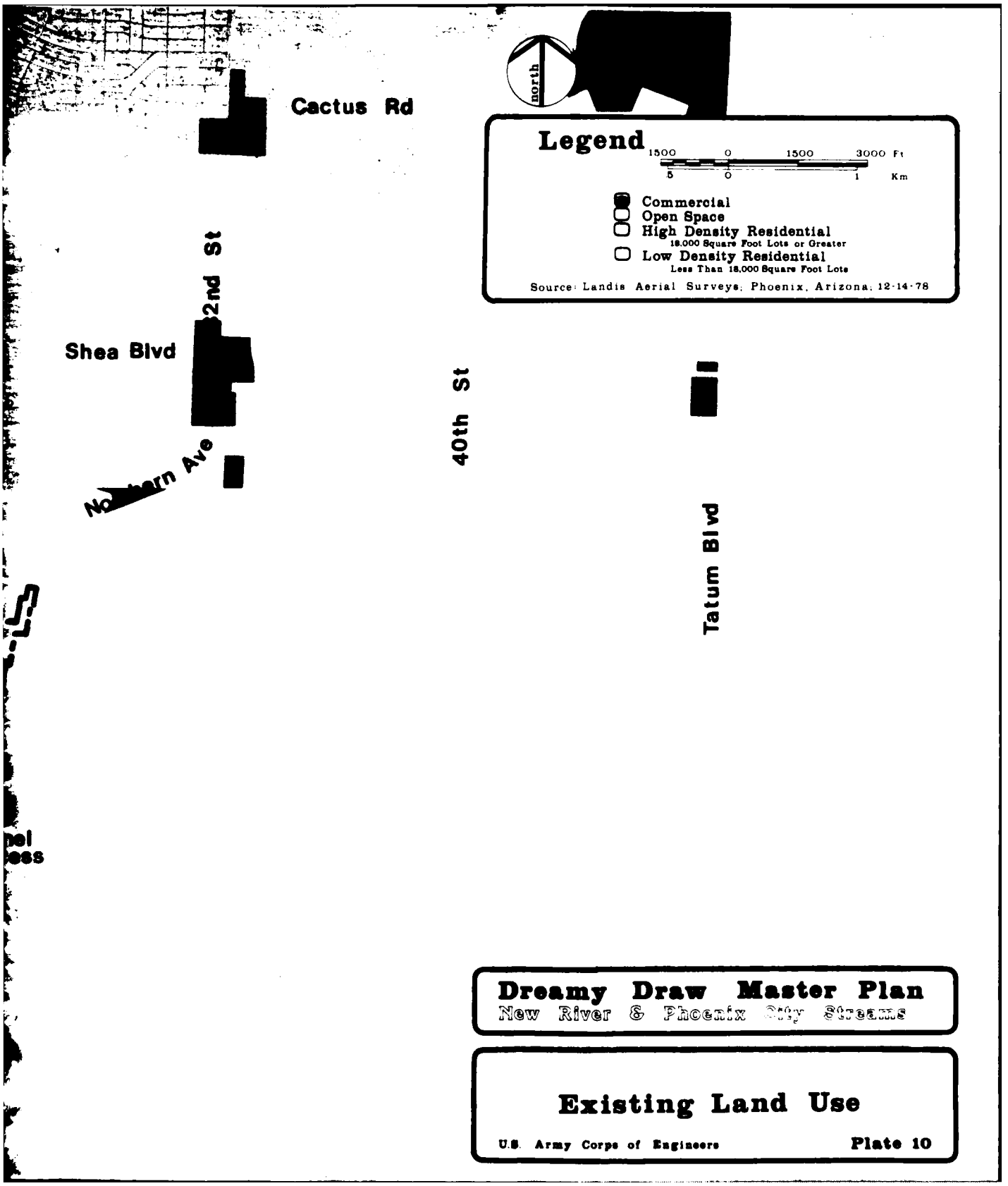
Dreamy Draw Master Plan
New River & Phoenix City Streams

Cross Section of Ecosystem

U.S. Army Corps of Engineers

Plate 9


Cactus
Shea Blvd
7th St
Dunlap Ave
PROJECT
BOUNDARY
Dreamy Draw Dam
Tunnel
Access
Northern Ave
12th St
16th St
Dreamy Draw Drive
19th St
Glendale Ave


north
Legend
1500 0 1500 3000 Ft
5 0 1 Km
Commercial
Open Space
High Density Residential
18,000 Square Foot Lots or Greater
Low Density Residential
Less Than 18,000 Square Foot Lots
Source: Landis Aerial Surveys, Phoenix, Arizona, 12-14-78
Cactus Rd
Shea Blvd
32nd St
40th St
Tatum Blvd
Dreamy Draw Master Plan
New River & Phoenix City Streams
Existing Land Use
U.S. Army Corps of Engineers
Plate 10

New River and Phoenix City Streams, Arizona

Recreation Market Area

DREAMY DRAW DAM

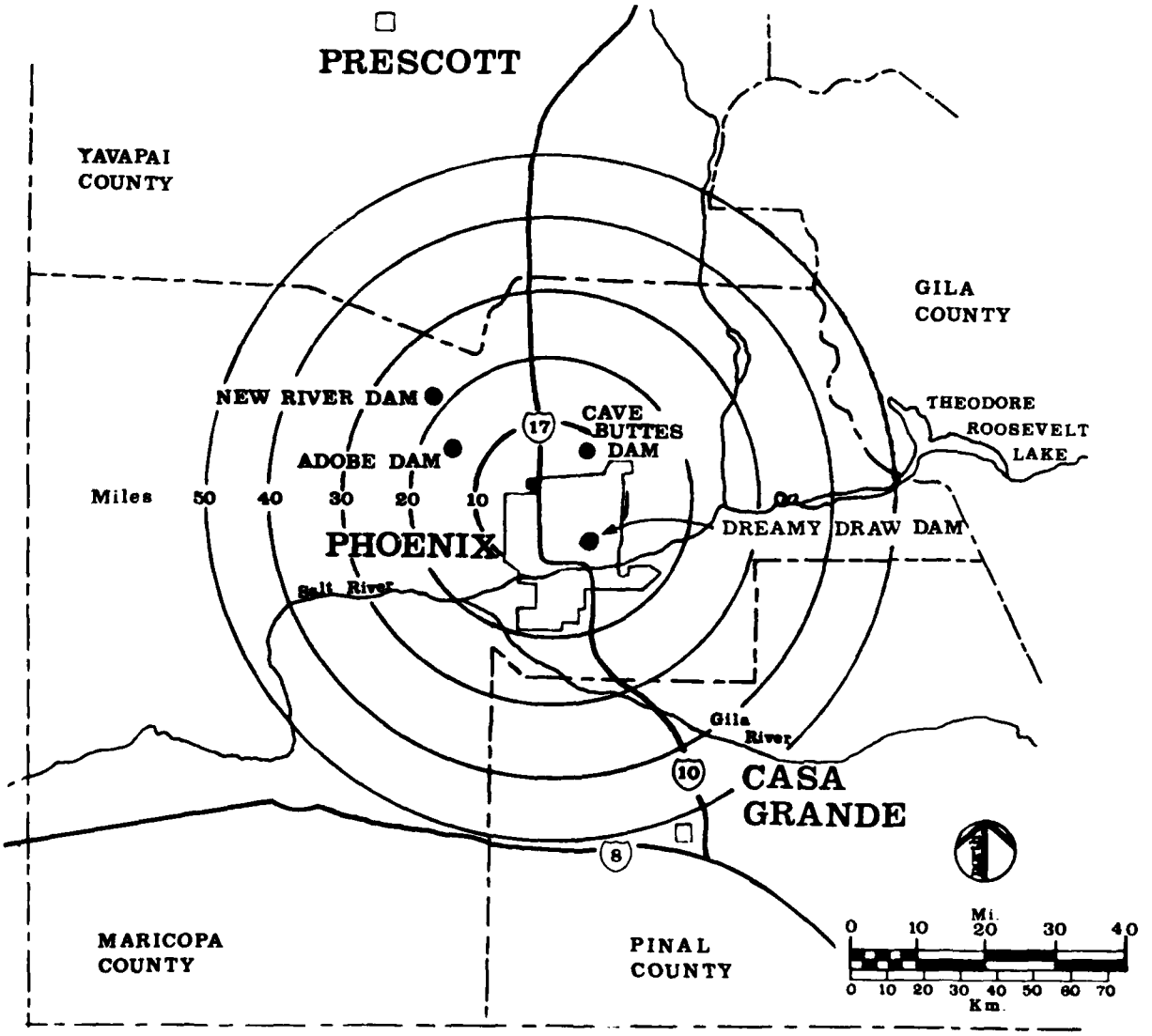
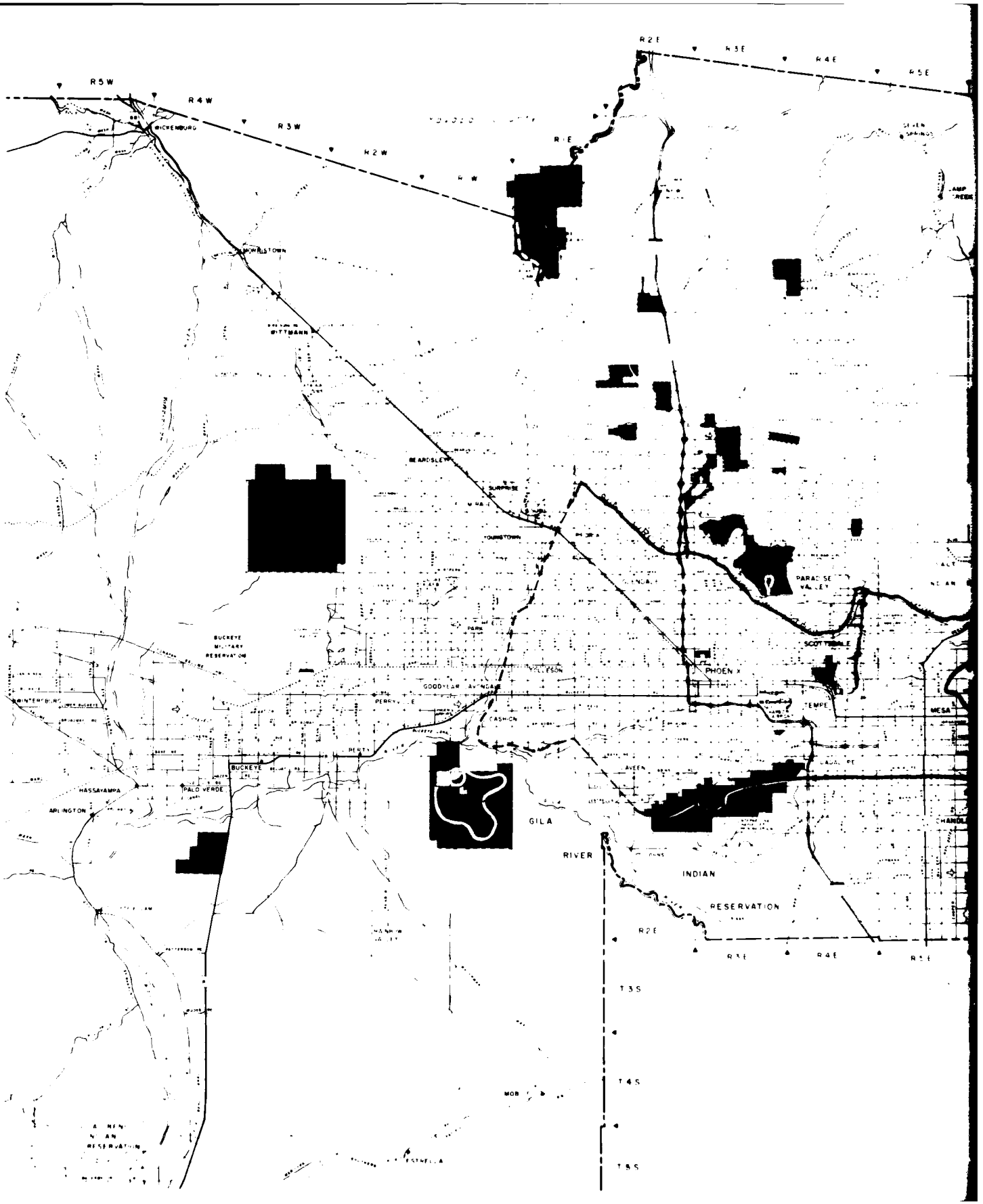
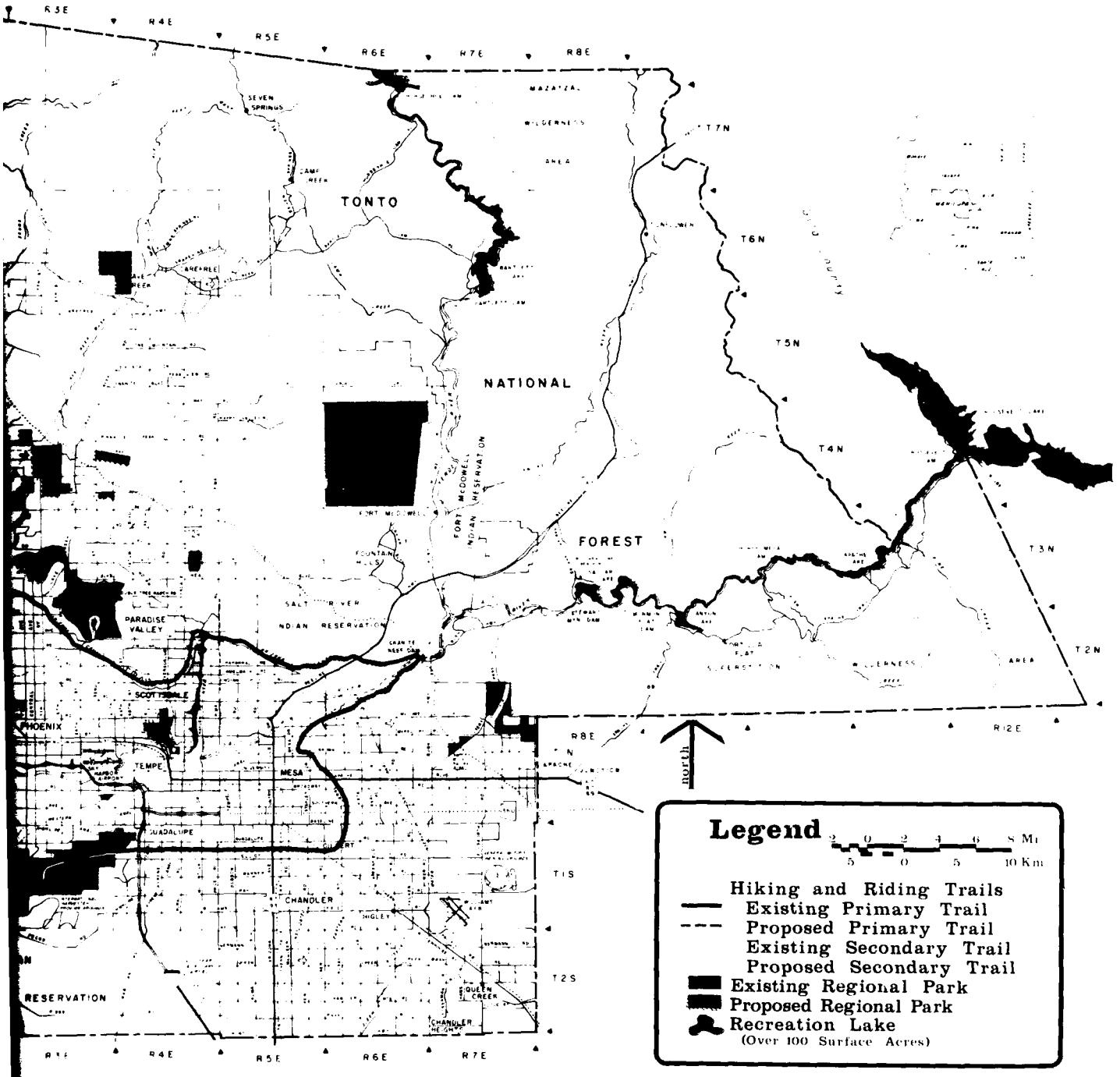


Plate II


R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
WICKENBURG
BUCKEYE
MILITARY
RESERVATION
GOODYEAR
AVONDALE
PERRYVILLE
FASHION
BUCKEYE
HASSAYAMPA
PALO VERDE
ARLINGTON
BEARDSLEY
SURPRISE
YOUNGTOWN
PARADISE
VALLEY
SCOTTSDALE
PHOENIX
TEMPE
MESA
GILA
RIVER
INDIAN
RESERVATION
T3S
T4S
T5S

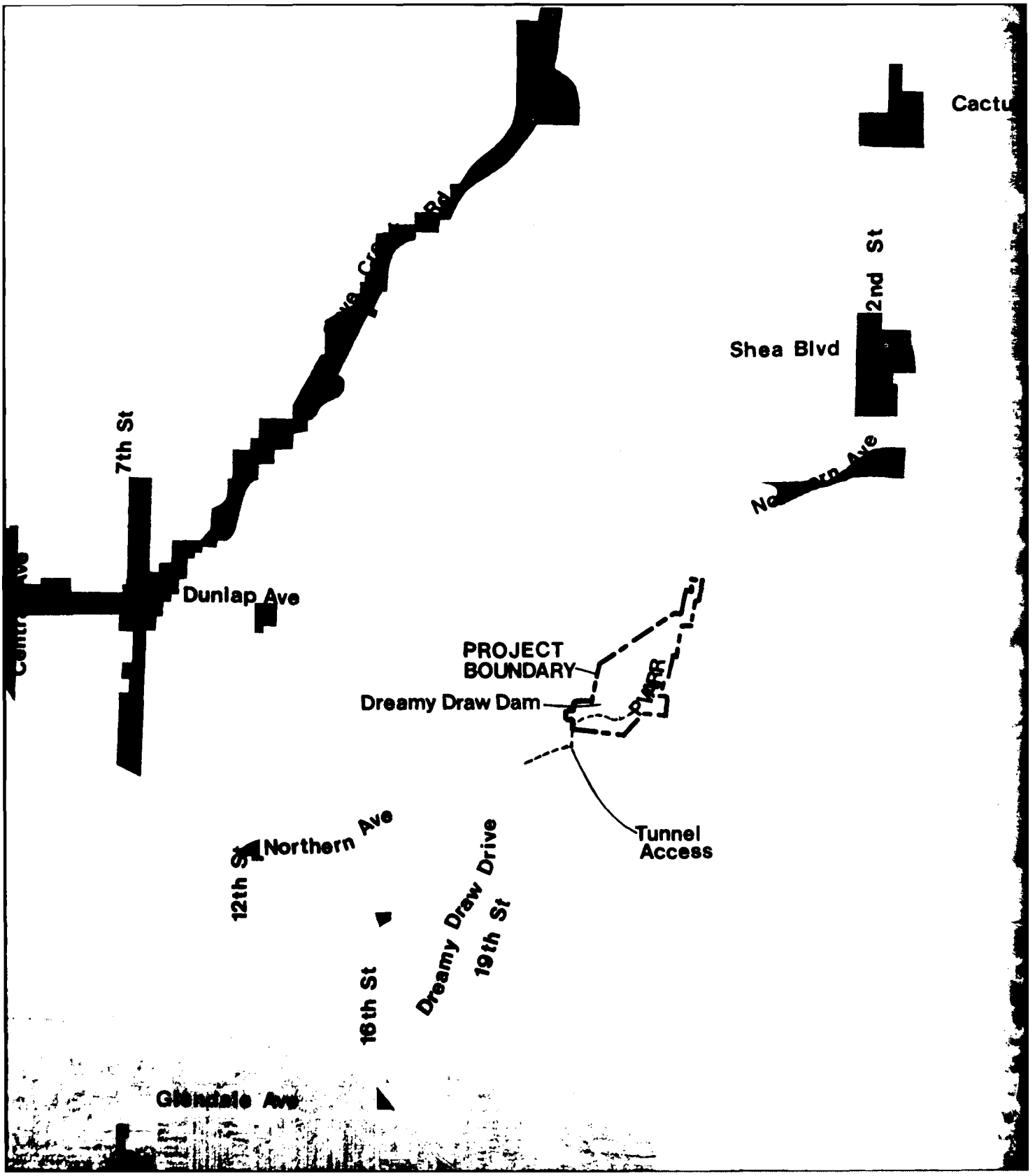


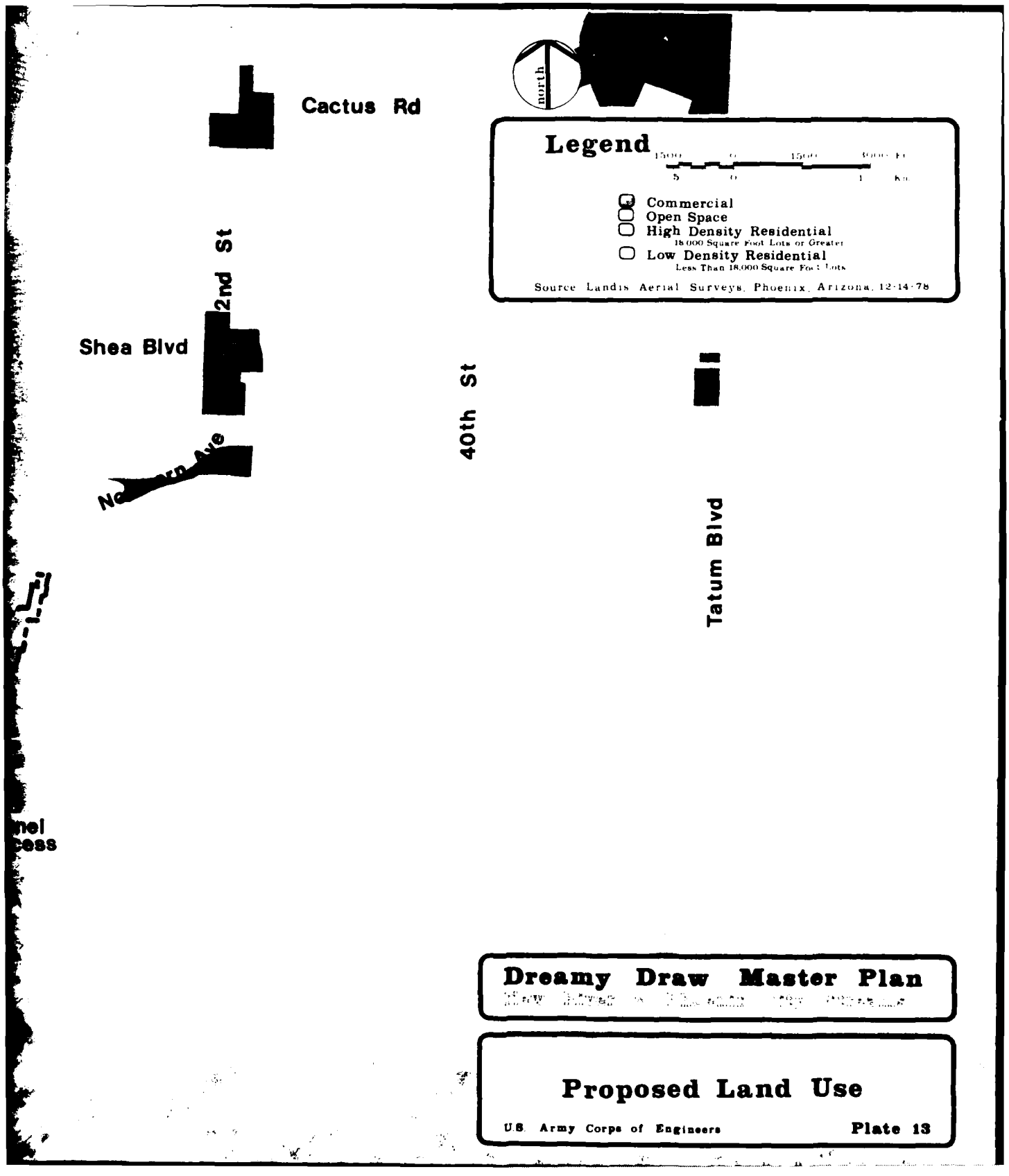
Dreamy Draw Master Plan

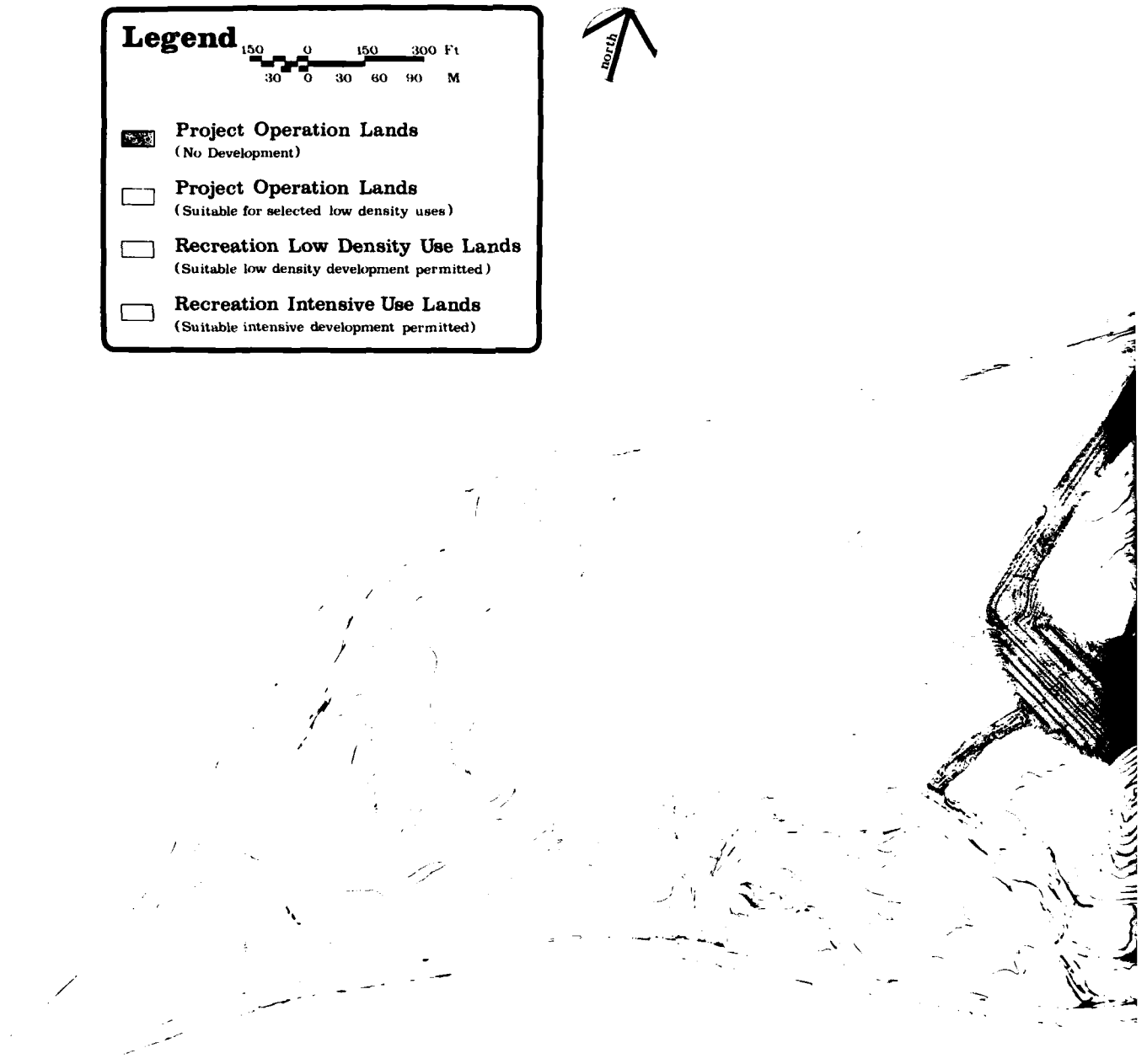
Recreation Resources in Maricopa County

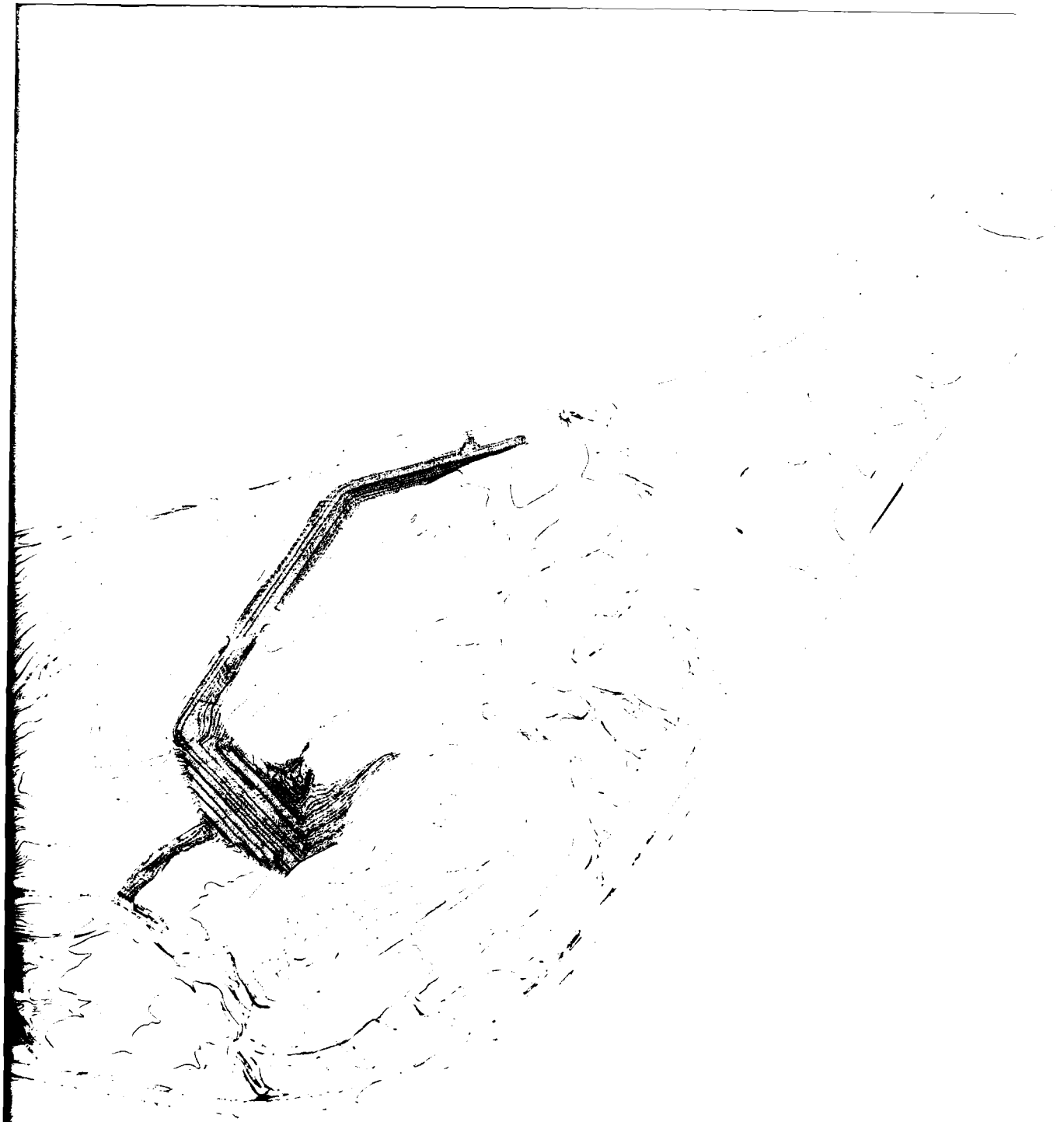
U.S. Army Corps of Engineers

Plate 12


Cactu
2nd St
Shea Blvd
7th St
Dunlap Ave
PROJECT
BOUNDARY
Dreamy Draw Dam
Tunnel
Access
Northern Ave
12th St
Dreamy Draw Drive
19th St
16th St
Glendale Ave


north
Cactus Rd
Shea Blvd
2nd St
40th St
Tatum Blvd
Legend
Commercial
Open Space
High Density Residential
18,000 Square Foot Lots or Greater
Low Density Residential
Less Than 18,000 Square Foot Lots
Source Landis Aerial Surveys, Phoenix, Arizona, 12-14-78
Dreamy Draw Master Plan
Proposed Land Use
U.S. Army Corps of Engineers
Plate 13


Legend
150 0 150 300 Ft
30 0 30 60 90 M
north
Project Operation Lands
(No Development)
Project Operation Lands
(Suitable for selected low density uses)
Recreation Low Density Use Lands
(Suitable low density development permitted)
Recreation Intensive Use Lands
(Suitable intensive development permitted)



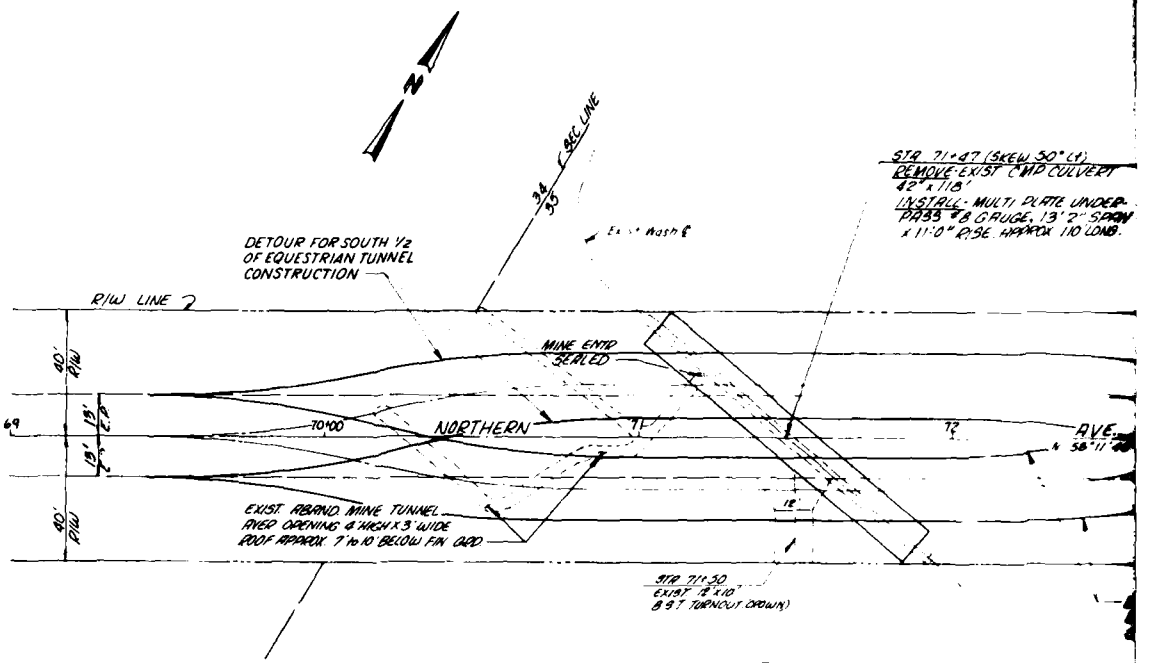
Dreamy Draw Master Plan

New River & Phoenix City Streams

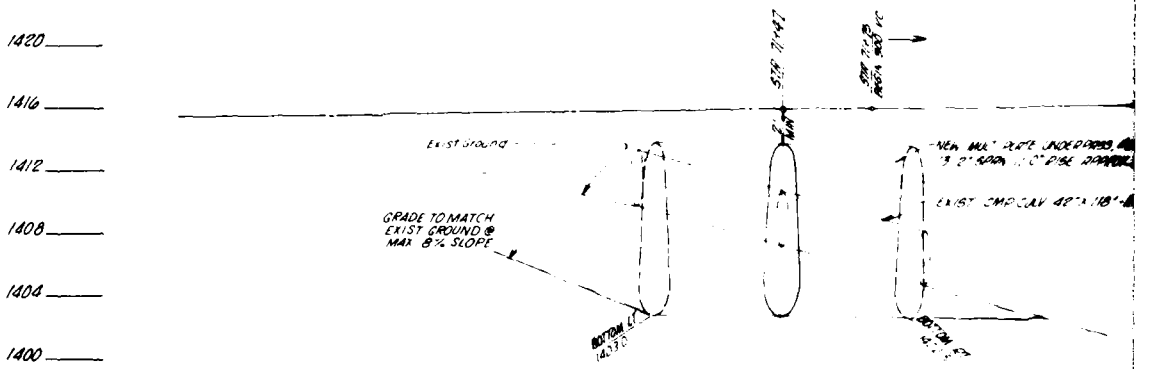
Land Use Plan

U.S Army Corps of Engineers

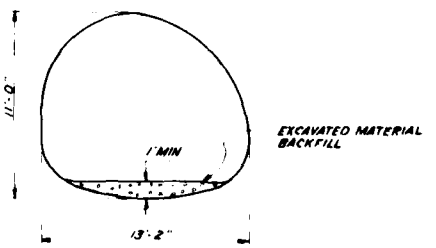
Plate 14



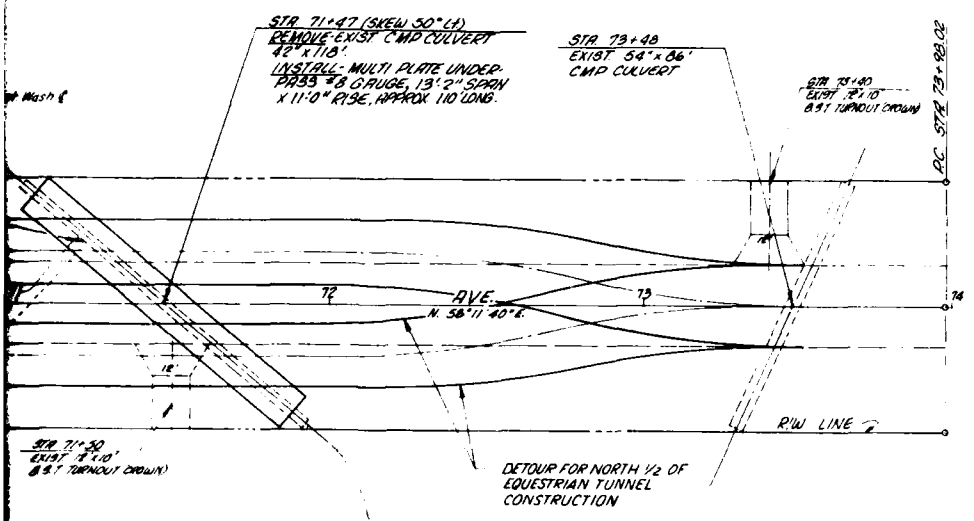
PLAN



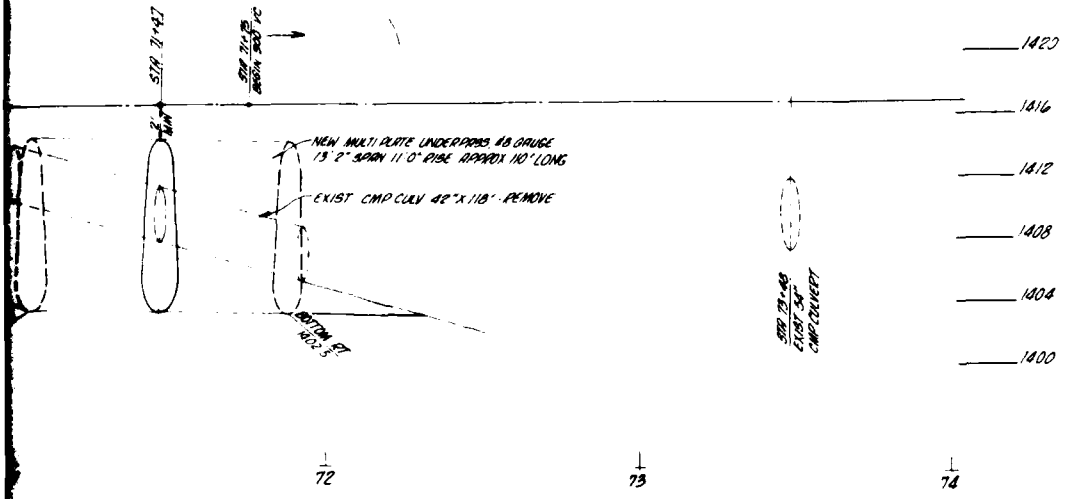
PROFILE



MULTI-PLATE C.M.P. UNDERPASS SECTION
(NTS)



PLAN

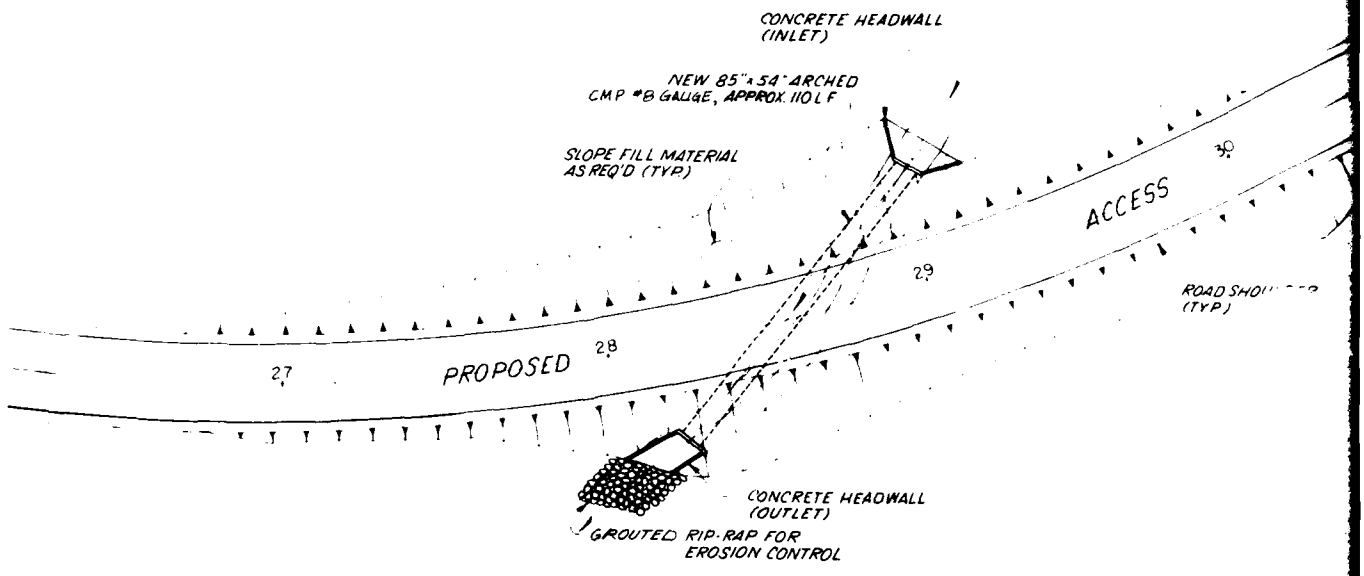


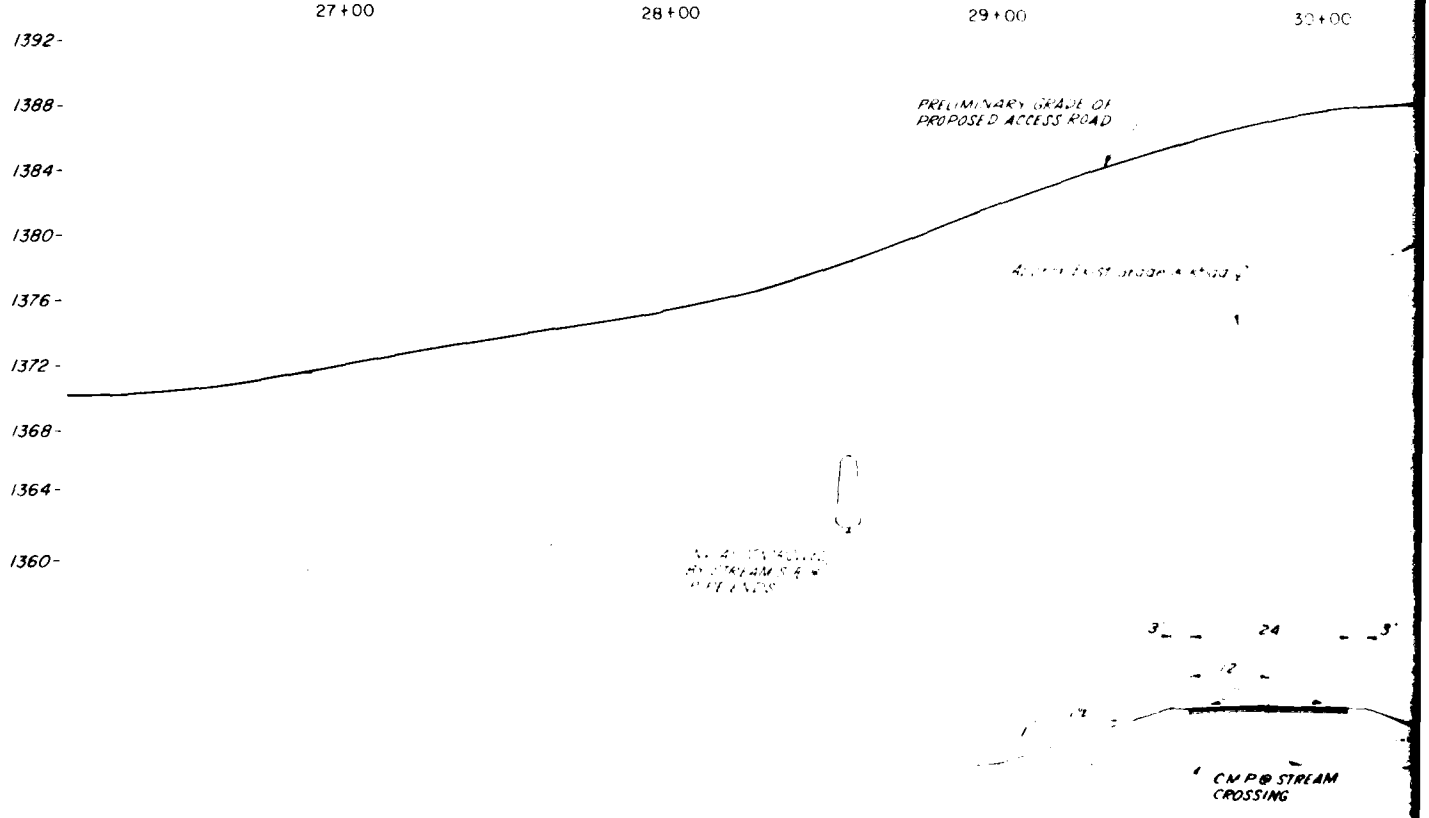
PROFILE

Dreamy Draw Master Plan
New River & Phoenix City Streams

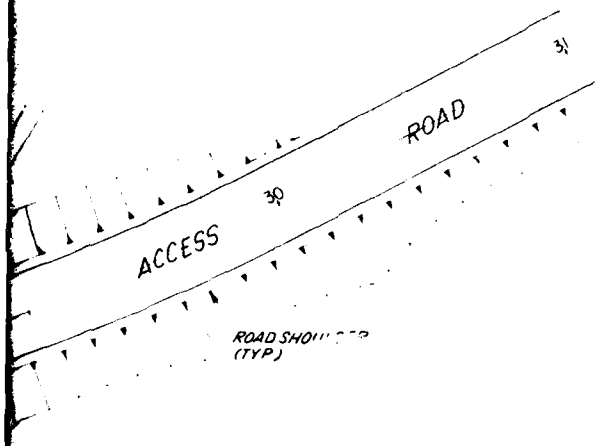
Equestrian Underpass

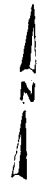
U.S. Army Corps of Engineers — Plate 15

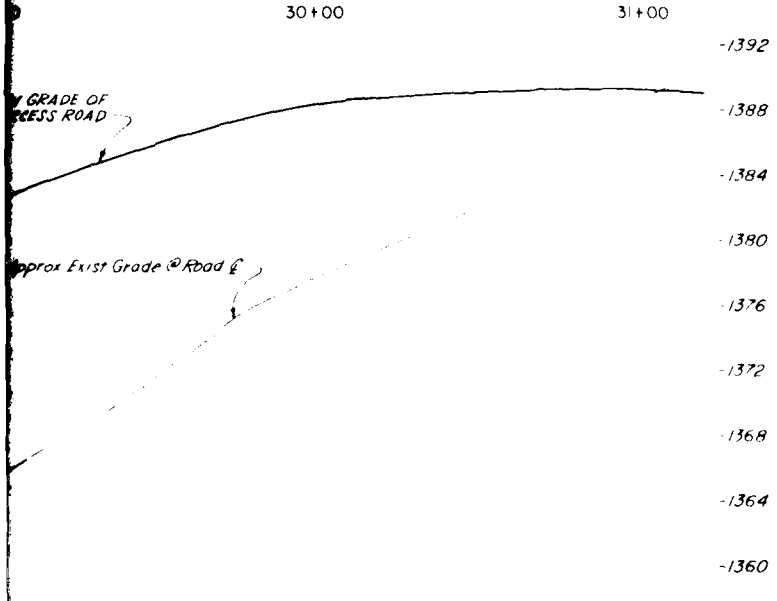


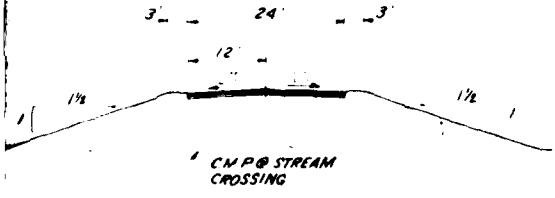


TYPICAL ROAD SECTION IN FILL AREAS







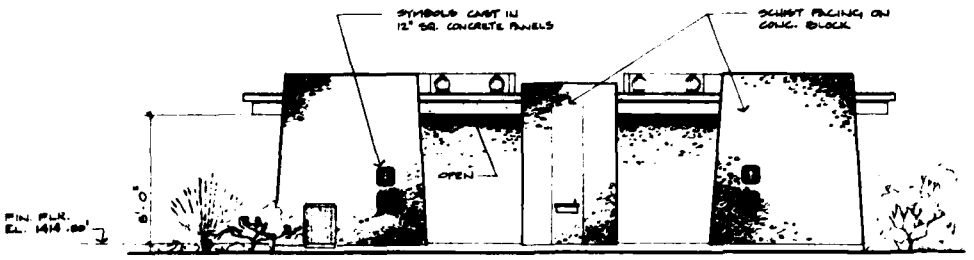


TYPICAL ROAD SECTION
IN FILL AREAS

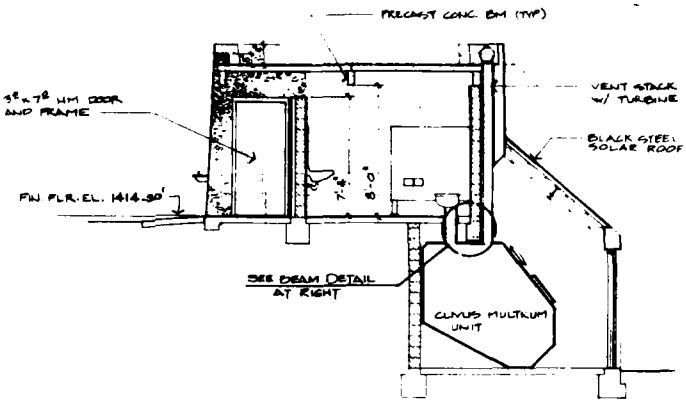
Dreamy Draw Master Plan
New River & Phoenix City Streams

Drainage Culvert

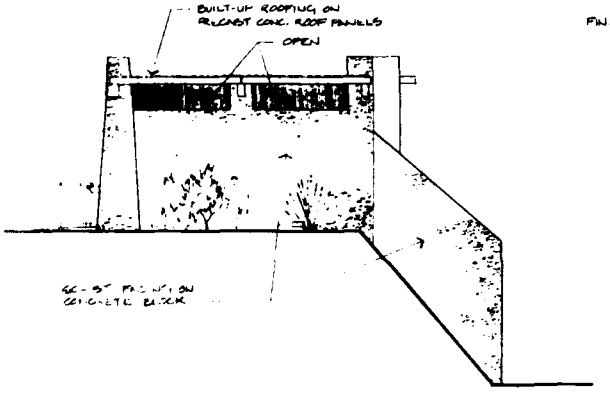
U.S. Army Corps of Engineers — Plate 16



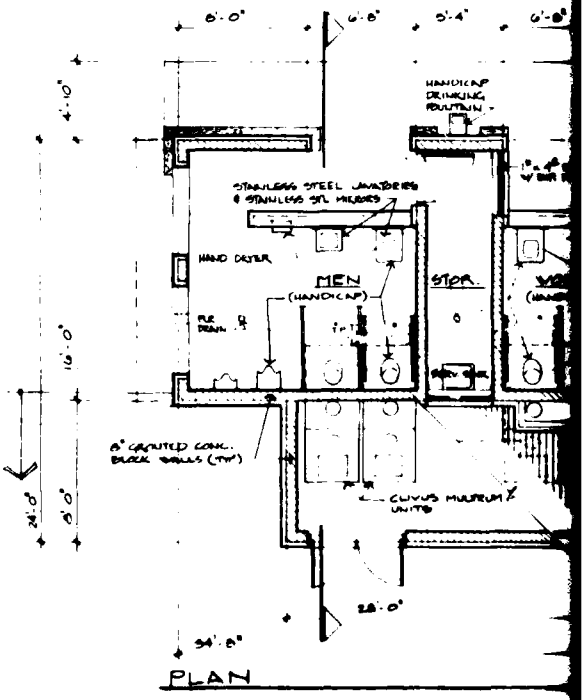
NORTH ELEVATION



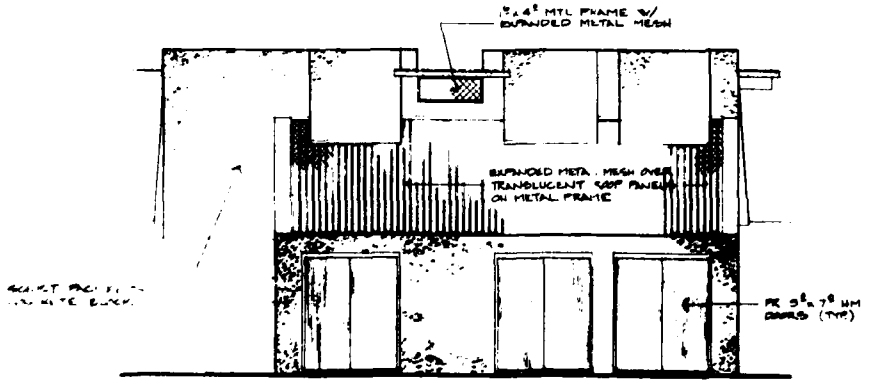
SECTION



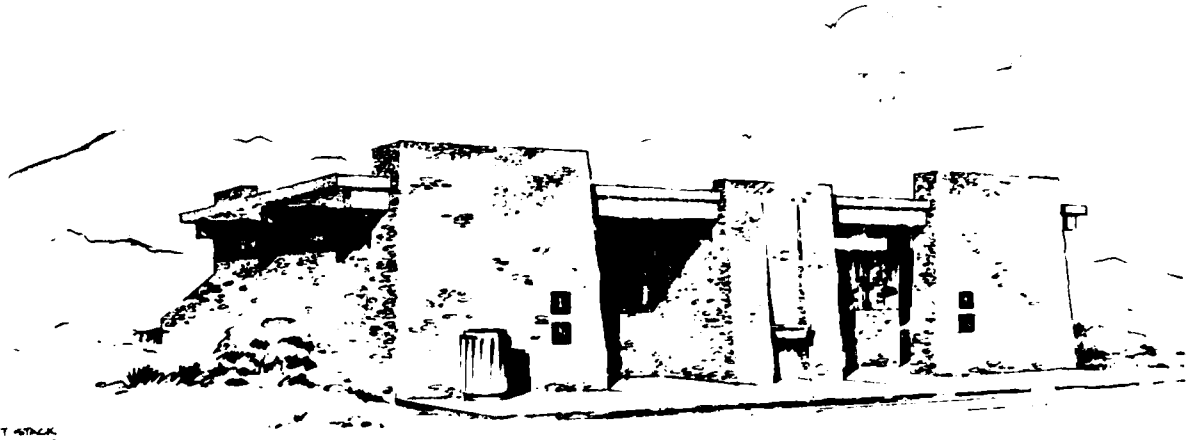
WEST ELEVATION

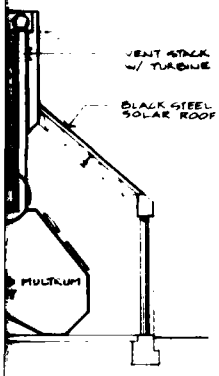


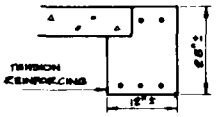
PLAN



SOUTH ELEVATION



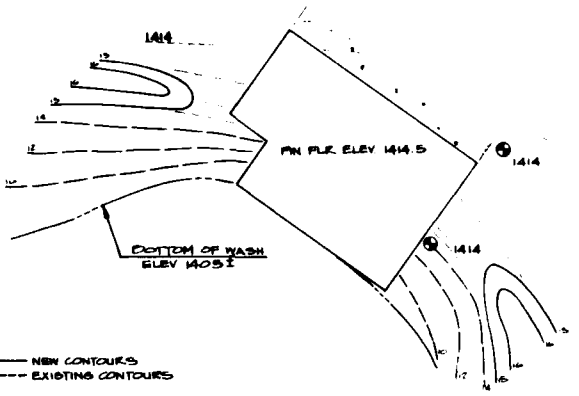




BEAM DETAIL

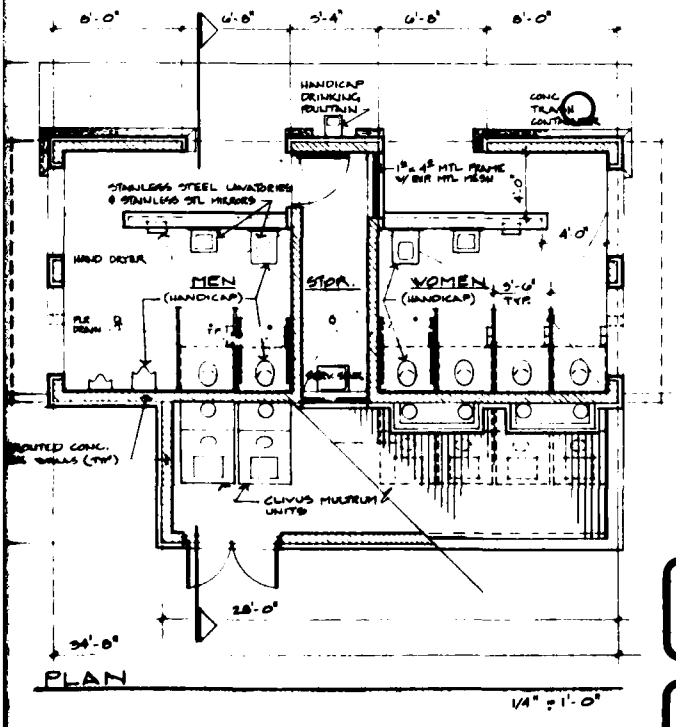
FLOOR BEAM OVER CLIVUS MULTIUM UNITS

MAXIMUM BEAM SPAN IS 14'-8"
BEAM WILL SUPPORT CONCRETE BLOCK WALL AND FLOOR SLAB.



GRADING PLAN

1"=10'-0"



PLAN

1/4" = 1'-0"

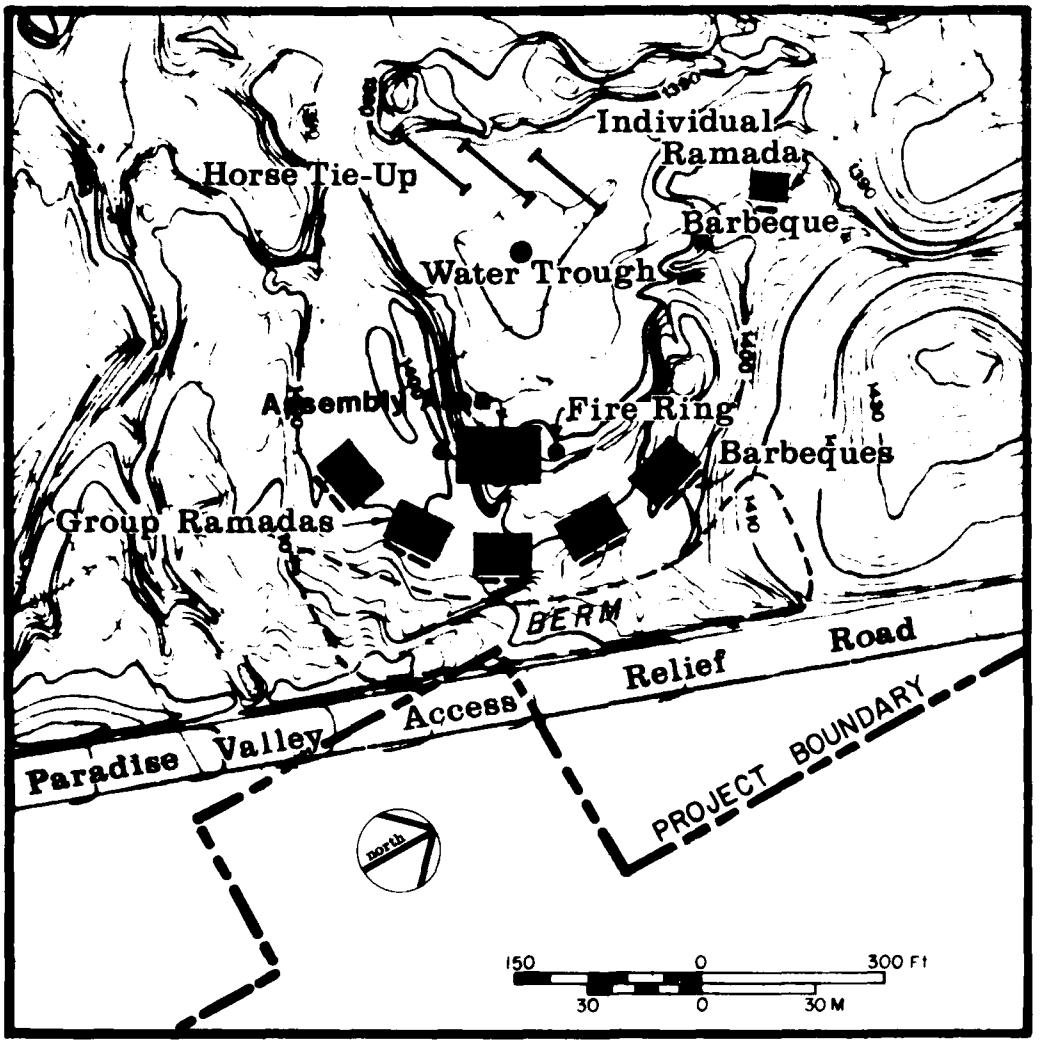
Dreamy Draw Master Plan

New River & Phoenix City Streams

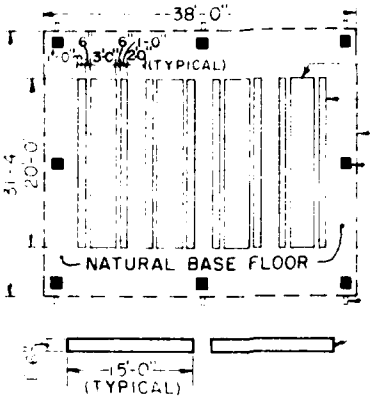
Restroom

U.S. Army Corps of Engineers

Plate 17

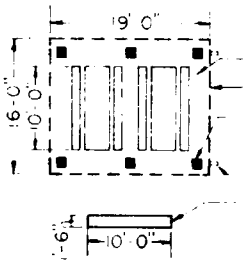


GROUP RAMADAS - See Detail
BARBEQUES - See Group Ramada Detail
INDIVIDUAL RAMADA - See Detail
BARBEQUE - See Individual Ramada Detail
MULTI-PURPOSE COURT - See Detail
FIRE RING - See Multi-Purpose Court Detail
HORSE TIE-UP - 60' LONG x 4' HIGH
3" DIA. GALV. HOLLOW PIPE,
SUPPORTED WITH 7 PIPES, 10' O.C.,
SET IN CONCRETE.
WATER TROUGH - 6' DIA., 4' HIGH, CONCRETE



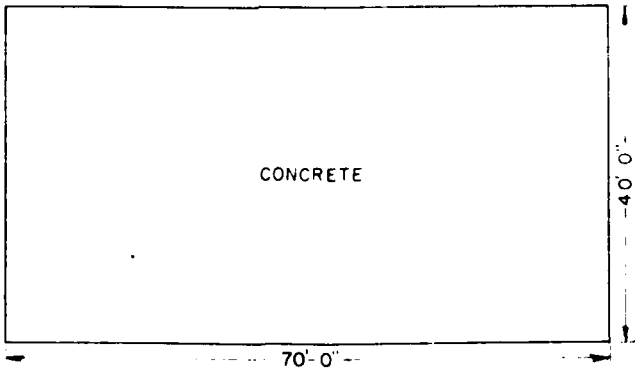
4" THICK PRECAST CONCRETE TABLE
4" THICK PRECAST CONCRETE BENCH
PRECAST CONCRETE ROOF
PRECAST CONCRETE COLUMN (8'-6") WITH LOCAL SCHIST FACING
CONCRETE BEAM
BARBEQUE (3' HIGH) CONCRETE WITH LOCAL SCHIST FACING STEEL GRILLS

GROUP RAMADA (TYPICAL) - 1"=20'



NOTE TABLE & BENCH- SEE GROUP RAMADA FOR DETAILS
NATURAL BASE FLOOR
PRECAST CONCRETE ROOF
PRECAST CONCRETE COLUMN (8'-6") WITH LOCAL SCHIST FACING
CONCRETE BEAM
BARBEQUE (3' HIGH) CONCRETE WITH LOCAL SCHIST FACING STEEL GRILLS

INDIVIDUAL RAMADA (TYPICAL) - 1"=20'



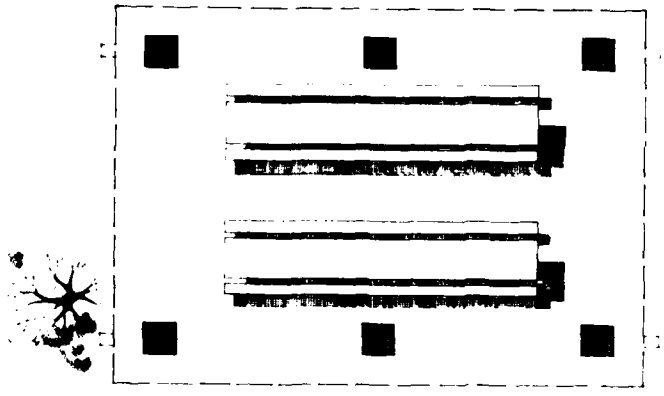
5' DIA METAL FIRE RING SEMI-CIRCULAR WITH SUPPORT LEGS

ASSEMBLY AREA - 1"=20'

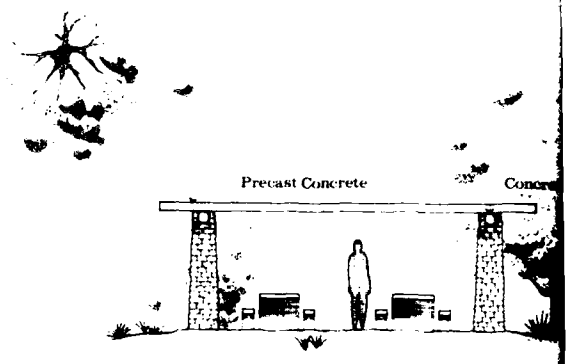
Dreamy Draw Master Plan
New River & Phoenix City Streams

Detail Site Plan

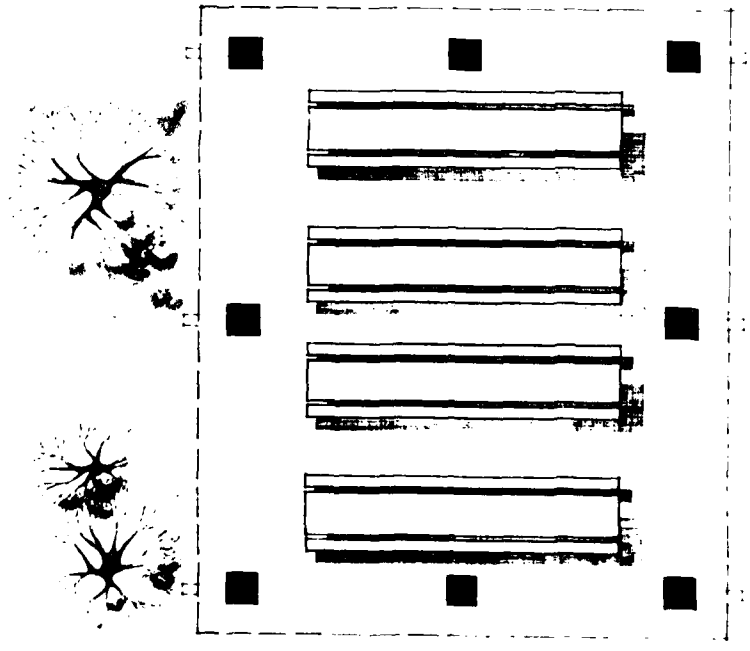
U.S. Army Corps of Engineers — Plate 18



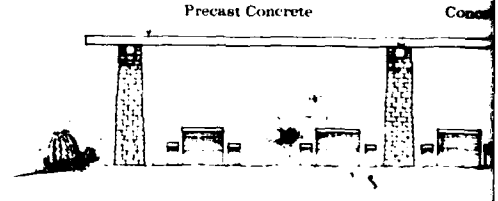
Individual Ramada · Floor Plan



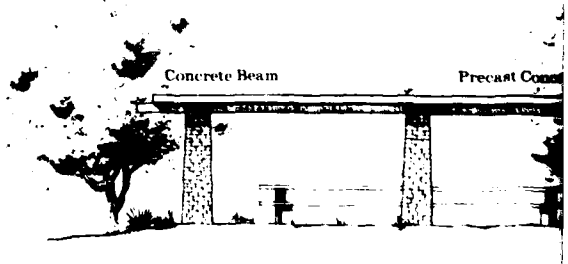
Individual Ramada · Elev



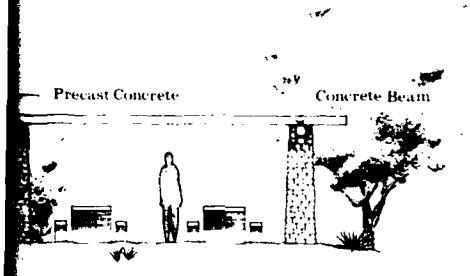
Group Ramada · Floor Plan



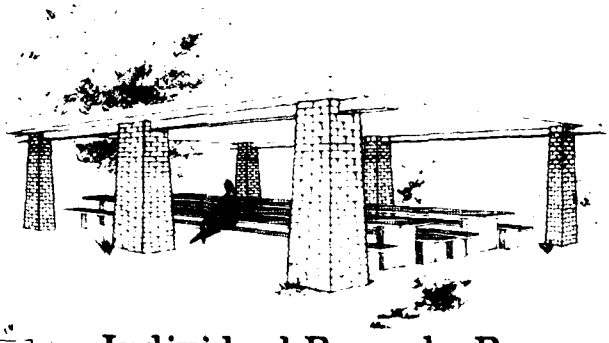
Group Ramada · Elevatio



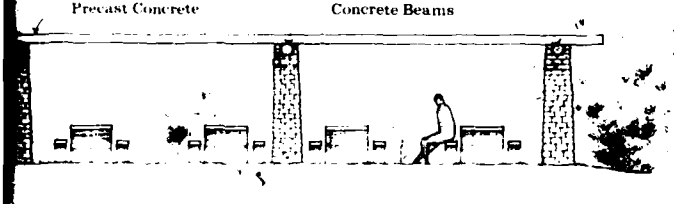
Group & Individual Rama



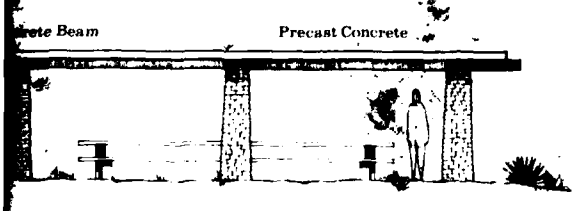
ividual Ramada · Elevation



Individual Ramada · Perspective



oup Ramada · Elevation

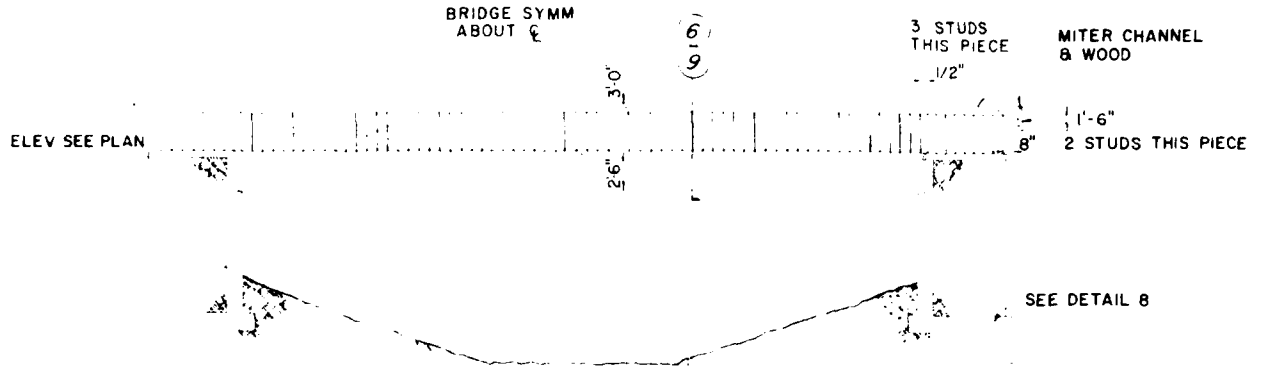


oup & Individual Ramada · Elevation

Dreamy Draw Master Plan
New River & Phoenix City Streams

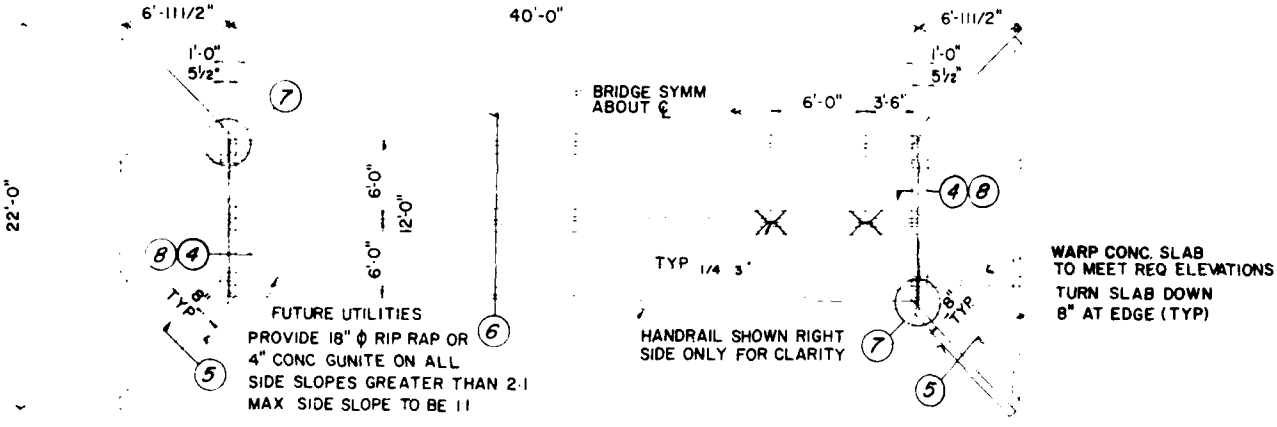
Ramada Complex

U.S. Army Corps of Engineers Plate 19



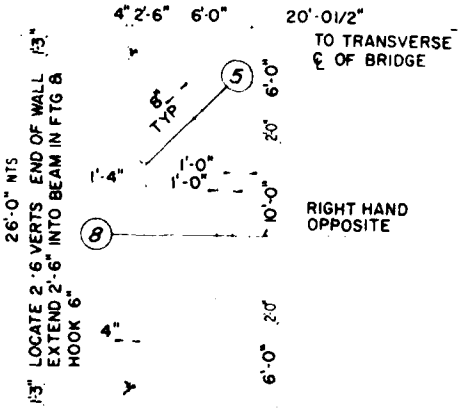
1 CROSS SECTION - ELEVATION

EXTEND STEM VERTICAL REINFO
INTO TOPPING & TIE TO TOPP
REINFORCEMENT.
PROVI
SLEEV
ABUT
(PLAST



2 FRAMING PLAN

3'-0"



3 FOUNDATION PLAN

GENERAL STRUCTURAL NOTES

1. CONSTRUCTION-CITY OF PHOENIX, STD DETAILS & M.A.G. SPECIFICATIONS, REVISED TO DATE.
2. DESIGN-A.A.S.H.T.O. SPECIFICATIONS FOR HIGHWAY BRIDGES, ELEVENTH EDITION, REVISED TO DATE.
3. LOADING-100 PSF LIVE LOAD
4. MATERIALS-
   - A. CONCRETE-CLASS "A", f'c 3000' MINIMUM AT 28 DAYS.
   - B. REINFORCING STEEL-ASTM A-615 GRADE 60 UNLESS OTHERWISE NOTED ON DRAWINGS, LAP SPLICE BARS 36 BAR DIAMETERS MINIMUM. STAGGER ALL SPLICE LOCATIONS 1 LAP LENGTH MINIMUM.
   - C. STRUCTURAL STEEL-ASTM A-36, Fy 36 K.S.I.
5. BACKFILL-M.A.G. SPECIFICATION 206 TO 95% COMPACTION
6. WELDING-CONFORM TO AMERICAN WELDING SOCIETY SPEC
7. CHAMFER-ALL EXPOSED CORNERS 3/4" UNLESS SHOWN OTHERWISE ON DRAWINGS

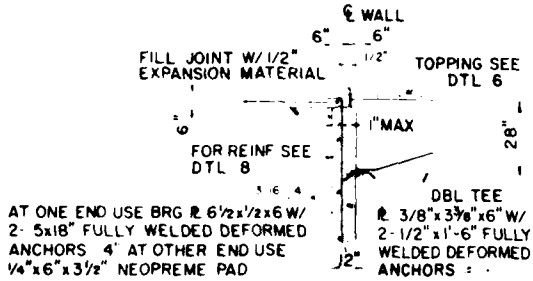
CONSTRUCTION NOTES

1. SHORE TOP OF ABUTMENT WALLS TO PREVENT LATERAL DISPLACEMENT. LEAVE SHORING IN FOR 7 DAYS MINIMUM AFTER TOP SLAB SHOWN IN DETAILS 5 & 8 IS IN PLACE.
2. DOUBLE TEES MAY BE SET BEFORE BACKFILL IS PLACED & USED AS A BRACE FOR ABUTMENT WALL. CONTRACTORS OPTION. SIDE WALLS MUST BE SHORED IF THIS IS DONE

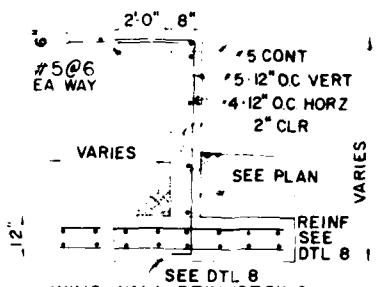
PRESTRESSED CONCRE

1. DESIGN & MANUFACTURE TO BE BY ARIZO COMPANY, T.P.A.C., OR EQUAL.
2. DESIGN, FABRICATE, TRANSPORT, & ERECT A.C.I. & P.C.I. CODES.
3. DESIGN FOR 100 PSF LIVE LOAD IN ADDI OF TOPPING & TEES.
4. CONCRETE TOPPING TO BE 4000 PSI STR

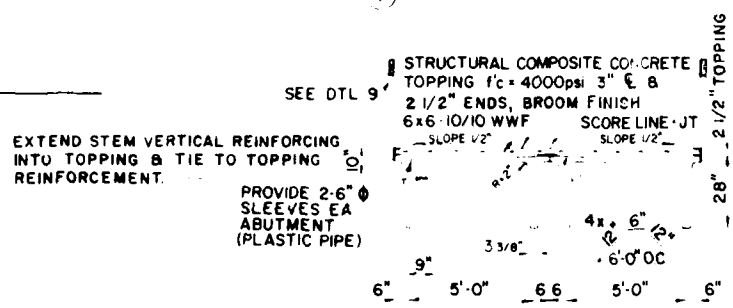
STUDS
MIS PIECE
MITER CHANNEL & WOOD
1/2"
1'-6"
8"
2 STUDS THIS PIECE
SEE DETAIL 8



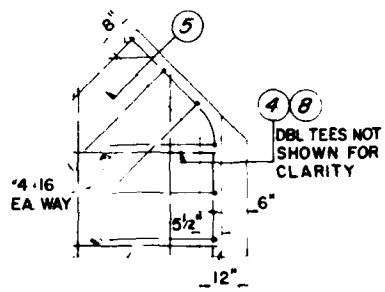
(4) DBL TEE BRG & RETAINING WALL



(5) WING WALL REINFORCING

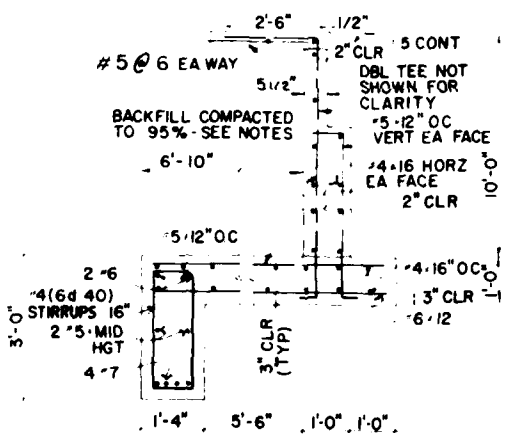


(6) SECTION - DOUBLE TEES

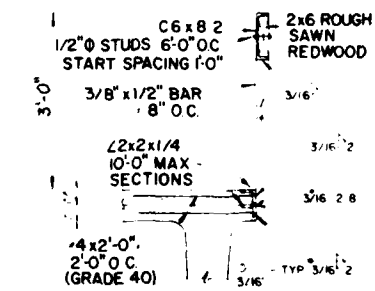


(7) PARTIAL REINF @ RETAINING WALL

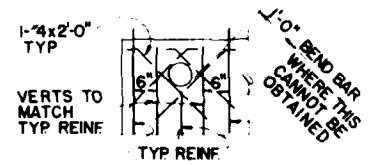
6'-11½"
1'-0"
8½"
4 8
WARP CONC SLAB TO MEET REQ ELEVATIONS
TURN SLAB DOWN 8" AT EDGE (TYP)
5



(8) REINFORCING @ RETAINING WALL



(9) HANDRAIL



(10) REINFORCING @ PIPE SLEEVE

A.G
DGES,
DAYS.
LESS
BARS
PLICE
TION.
PEC.
N
RAL
UM
CE.
CED
TORS

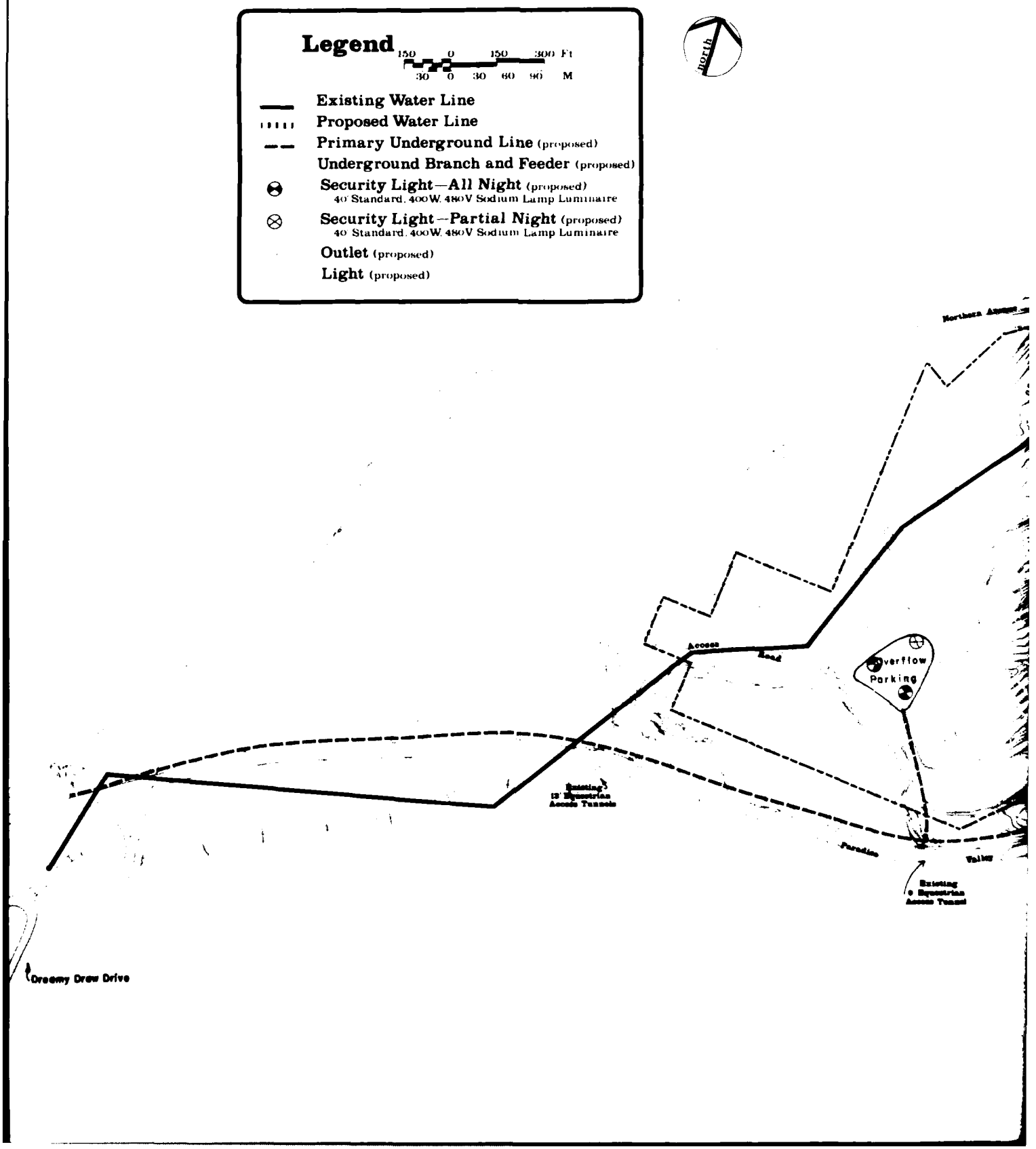
PRESTRESSED CONCRETE

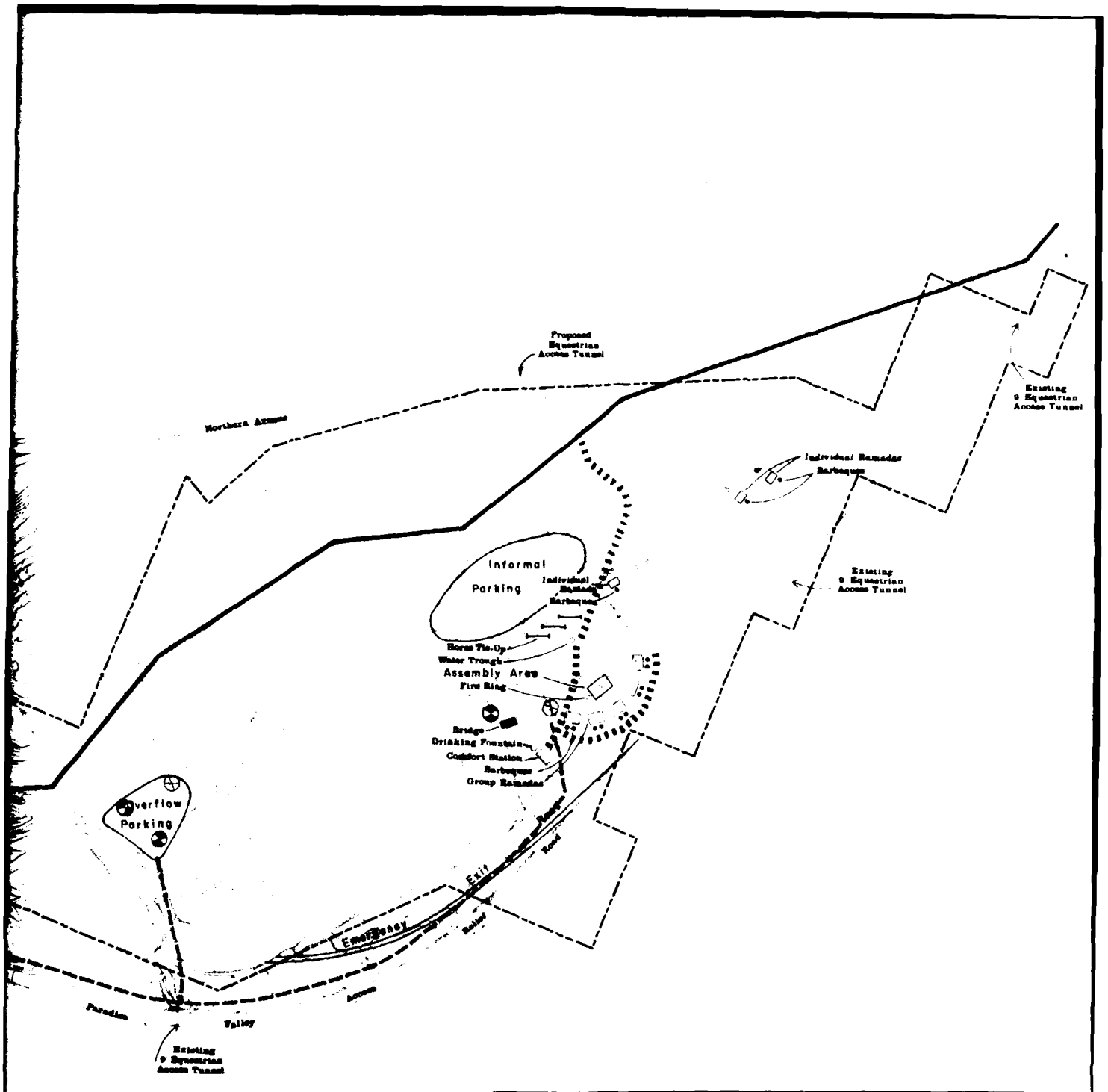
1. DESIGN & MANUFACTURE TO BE BY ARIZONA PRESTRESSED COMPANY, T.P.A.C., OR EQUAL.
2. DESIGN, FABRICATE, TRANSPORT, & ERECT PER LATEST A.C.I. & P.C.I. CODES.
3. DESIGN FOR 100 PSF LIVE LOAD IN ADDITION TO WEIGHT OF TOPPING & TEES.
4. CONCRETE TOPPING TO BE 4000 PSI STRENGTH.

Dreamy Draw Master Plan

Pedestrian Bridge

US Army Corps of Engineers — Plate 20


Legend
150 0 150 300 Ft
30 0 30 60 90 M
Existing Water Line
Proposed Water Line
Primary Underground Line (proposed)
Underground Branch and Feeder (proposed)
Security Light—All Night (proposed)
40' Standard, 400W, 480V Sodium Lamp Luminaire
Security Light—Partial Night (proposed)
40' Standard, 400W, 480V Sodium Lamp Luminaire
Outlet (proposed)
Light (proposed)
North
Northern Avenue
Access Road
Overflow Parking
Existing 12' Equestrian Access Tunnel
Paradise Valley
Existing 8' Equestrian Access Tunnel
Dreamy Drew Drive



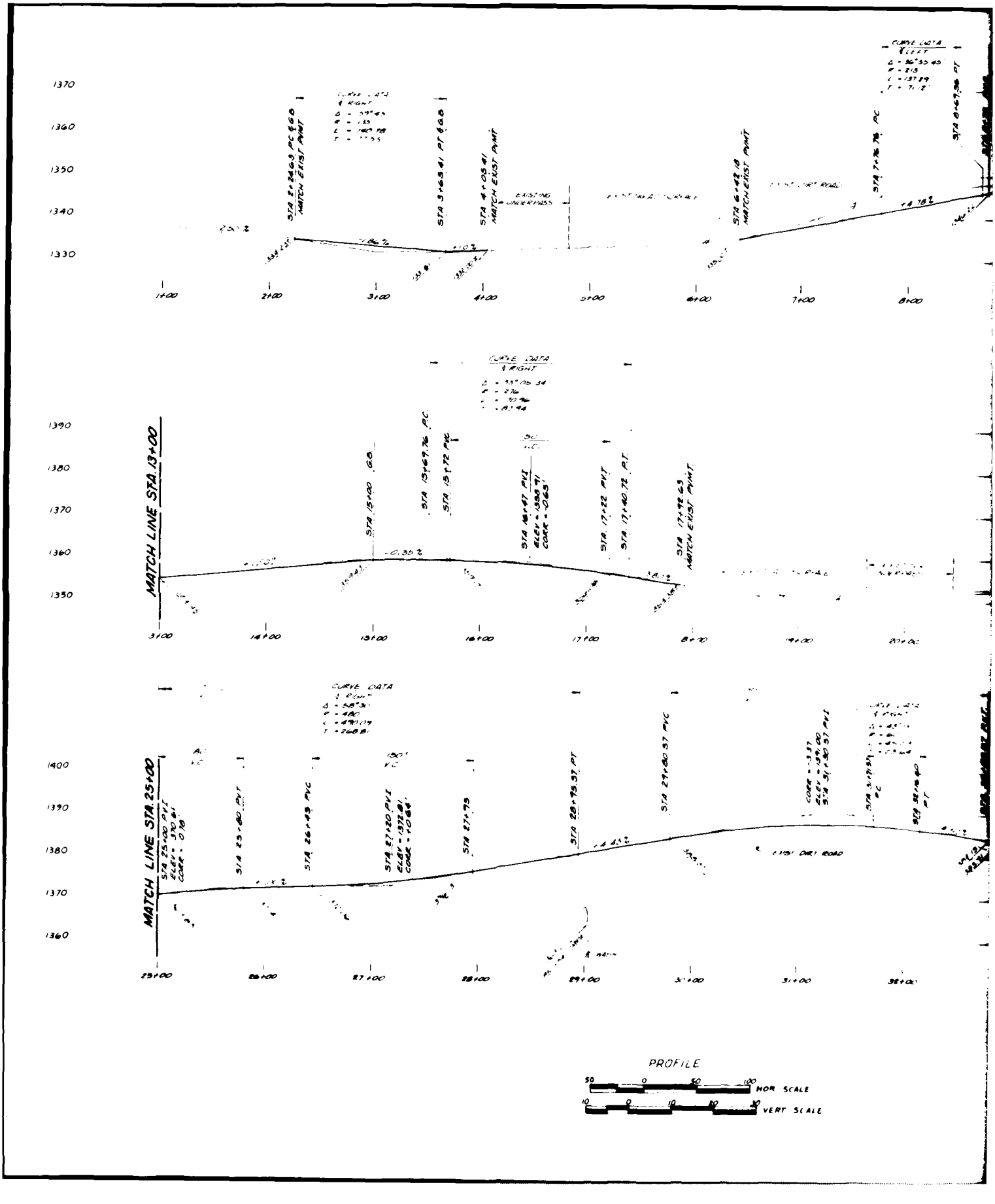
Dreamy Draw Master Plan

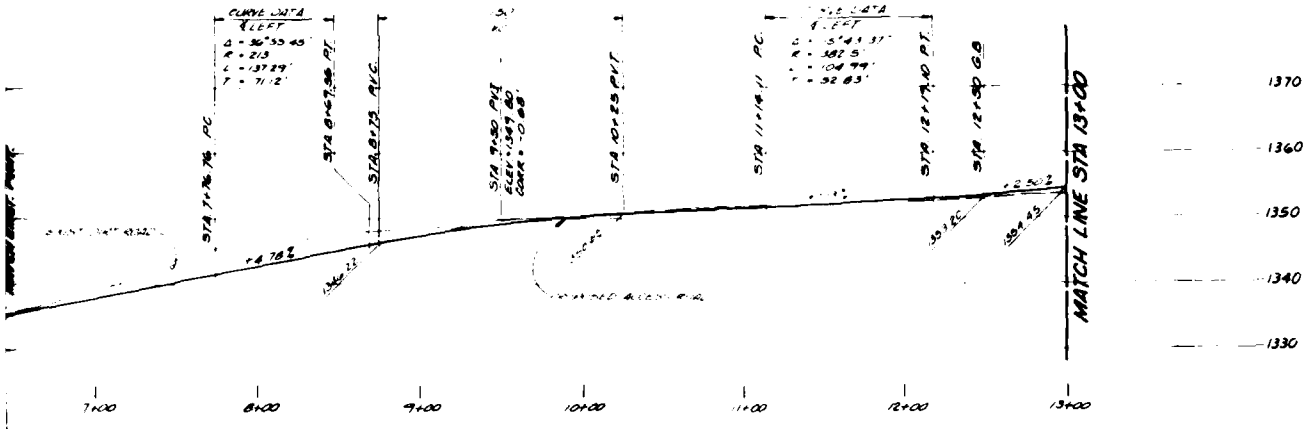
New River & Phoenix City Streams

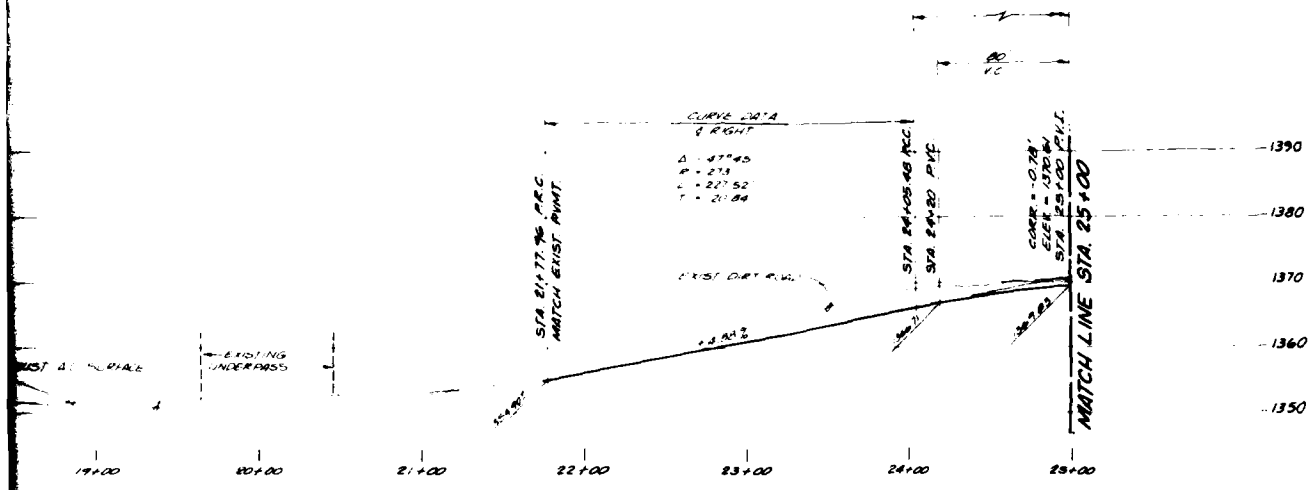
Water and Electrical Plan

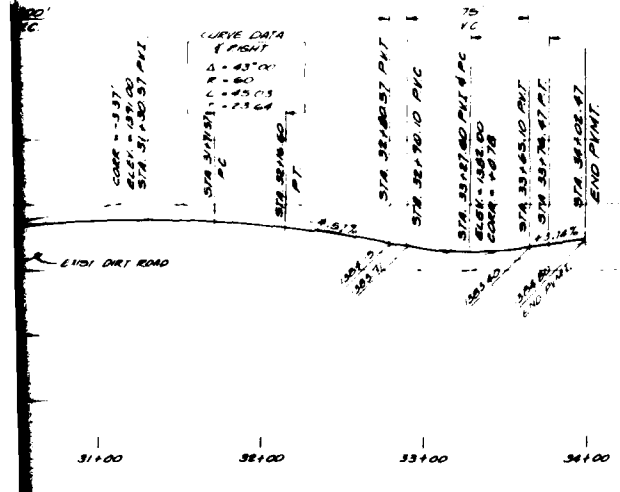
U.S. Army Corps of Engineers

Plate 21


MATCH LINE STA. 13+00
MATCH LINE STA. 25+00
EXISTING UNDERPASS
EXIST DIRT ROAD
PROFILE
HOR SCALE
VERT SCALE







NOTE
FOR ALIGNMENT OF ACCESS ROAD SEE PLATE 3.

HOR SCALE

VERT. SCALE

Dreamy Draw Master Plan

New River & Phoenix City Streams

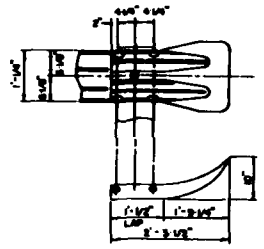
Access Road

U.S. Army Corps of Engineers

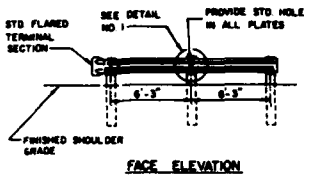
Plate 22

NOTES

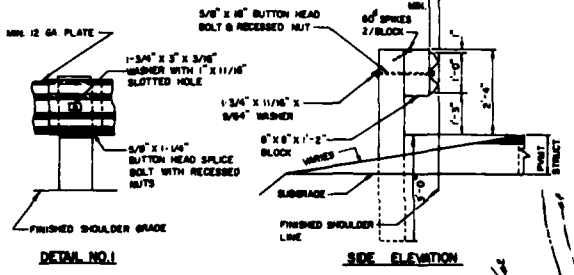
1. POSTS AND BLOCKS SHALL BE NOMINAL 6"x8" REDWOOD, PRESSURE TREATED AND UNPAINTED. HOLES SHALL BE DRILLED BEFORE TREATMENT.
2. ALL GUARD RAIL PLATE, FITTINGS, HARDWARE, ETC. SHALL BE GALVANIZED.



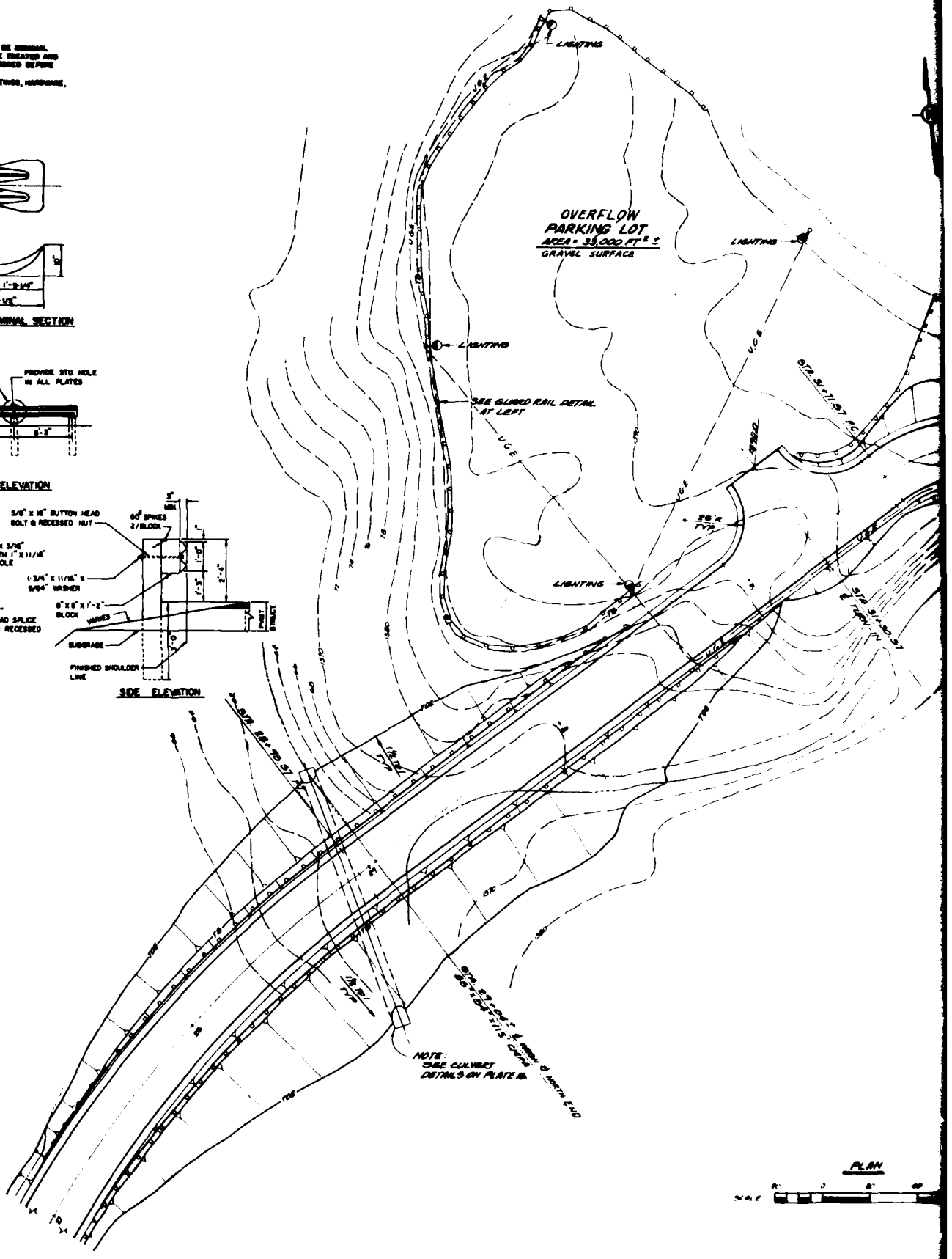
STANDARD FLARED TERMINAL SECTION

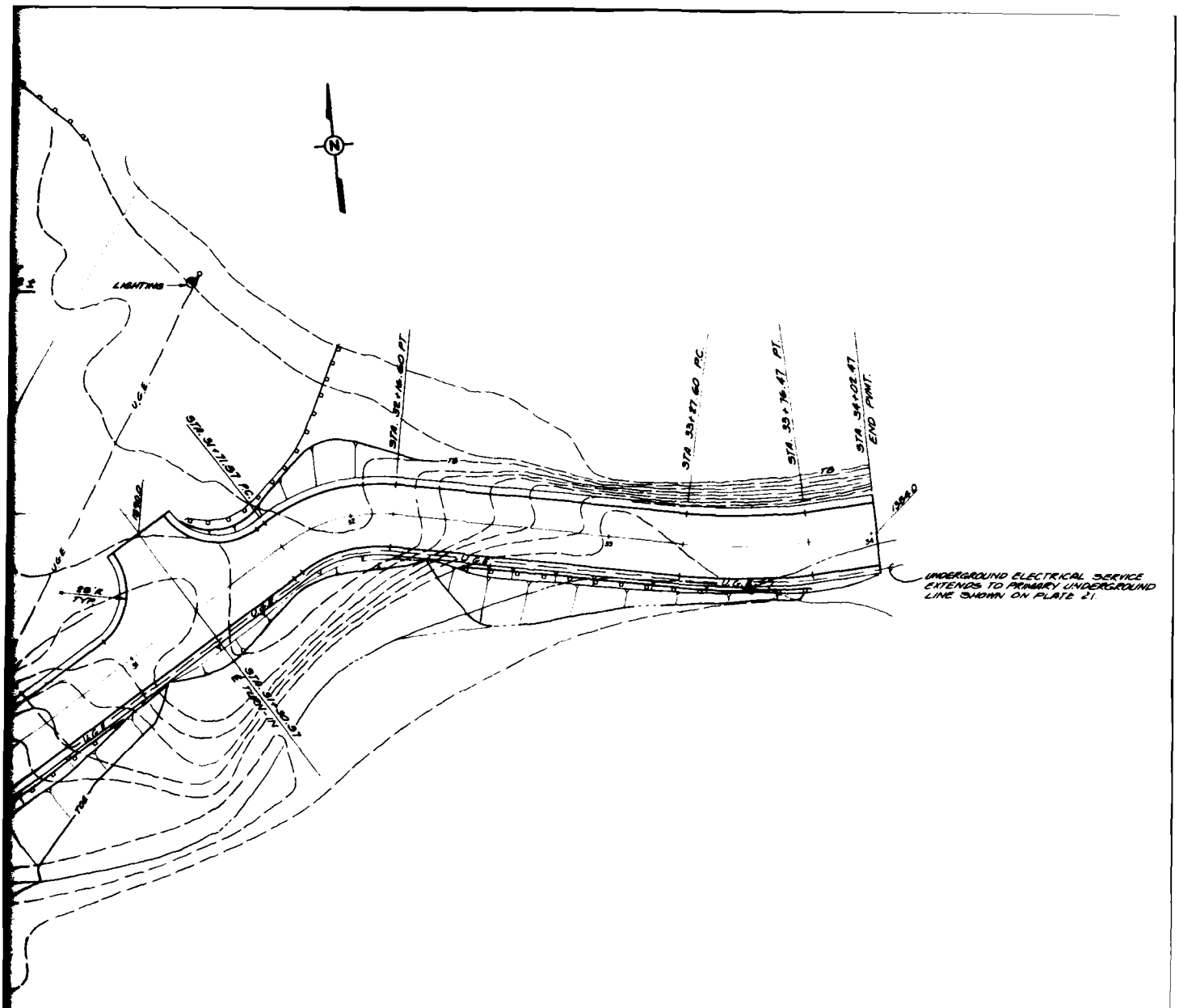


FACE ELEVATION



DETAIL NO.1 SIDE ELEVATION





PLAN

SCALE 20 0 20 40 60 FEET

Dreamy Draw Master Plan

New River & Phoenix City Streams

Parking Area

U.S. Army Corps of Engineers

Plate 23